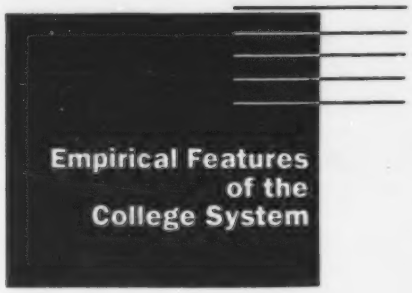
# Empirical Features of the College System

## Background Papers

VISION 2000




Background Papers

# Vision 2000
# A Review of the Mandate of the Colleges of Applied Arts and Technology

VISION 2000

January 1990

91-00160/

Vision 2000 is a review of the mandate of Ontario's Colleges of Applied Arts and Technology. It is coordinated by the Ontario Council of Regents and was initiated by the Minister of Colleges and Universities in October of 1988.

A Steering Committee, with broad-based representation, was established to guide the Vision 2000 process. Consultation, with a wide variety of stakeholders, and research was handled by five study teams. Study Team 1's task was to provide an empirical snapshot of the current college system and its external environment. Researchers from Study Team 2 examined the role of colleges in our changing economy, while Study Team 3 looked into ways that the college system could promote access and educational support for diverse learners. Study Team 4's purpose was to study the challenging interrelationships of quality, accessibility and efficiency. For Study Team 5 the research and consultation focussed on the linkages between colleges and other educational institutions.

The background papers in this volume are part of a number of publications by researchers prepared for Vision 2000. These papers do not necessarily represent the views of the Study Teams, the Vision 2000 Steering Committee, or the Ontario Council of Regents.

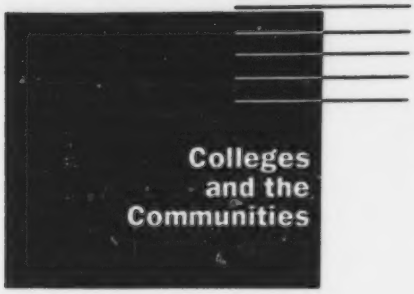
Together the background papers are meant to provide a broad base of ideas as part of the input for the deliberations of the study teams and the Steering Committee.

Ontario Council of Regents
Ministry of Colleges and Universities
790 Bay Street, 10th Floor
Toronto, Ontario
M5G 1N8

(416) 965-4234
Fax: (416) 963-1278

Ontario

Communications Coordinator
Catherine Clement




Background Papers

Vision 2000

# The College System—An Empirical Snapshot

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David K. Foot and Maia MacNiven

## The Determinants of Enrolment Rates and Enrolments in Ontario Community Colleges

January 1990

## Study Team 1 Members

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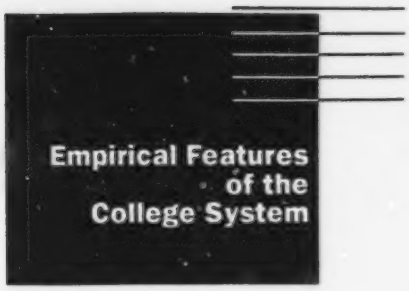
**Chair**
Howard Rundle

**Executive Officer**
Brian Wolfe

**Members**
Robert Bernhardt
Helen Burstyn
Ron Chopowick
Peter Dawson
Ron Golemba
C.Y. Hsu
Drew Nameth
Karen O'Kain
Michel Parent
Robert Struthers
Ralph Wood
Herb Young




Background Papers

Vision 2000

# The College System — An Empirical Snapshot

Study Team 1

## Introduction

Study Team 1 completed 23 research projects on various aspects of the Ontario college system with comparisons to other educational systems, both nationally and internationally. Complete research reports are filed with the Ontario Council of Regents and are available upon request. Highlights of these reports, consisting of two- or three-page summaries, together with suggested implications, are reproduced in this paper. These highlight documents have been arbitrarily grouped in the Table of Contents for ease of reading.

Some of the research reports of Study Team 1 have been published previously in the Vision 2000 Environmental Scan. The data from those reports are not reproduced here.

Research reports and highlight documents were prepared by individuals or small groups,[1] and reviewed by the team as a whole, prior to publication. This process was all the more effective as Study Team 1 had representation from colleges (including administration and faculty), the Ministry of Colleges and Universities, the Ministry of Skills Development, and the Ontario Council of Regents.

Special acknowledgement is given to the Ministry of Colleges and Universities (i.e., Drew Nameth and staff) who provided assistance, advice, and access to data retained by the Ministry.

1 Although some funding was available to hire researchers to undertake a few of these projects, the overwhelming majority of the projects were conducted by the volunteer members of the study team.

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## 1. College Students

### Statistical Profile of Full-Time, Post-Secondary, College Students (Project #1)

- Full-time post-secondary (FTPS) students account for about 58% of total full-time equivalent enrolment in the college system. Skills training sponsored by the Federal government and the Ontario Ministry of Skills Development accounts for another 27% of total enrolment, while the remaining 15% consists of students studying on a part-time basis.

- System-wide data on student characteristics (e.g., education, age, and last activity prior to enrolling in college) is available for full-time post-secondary students but not for other types of students.

#### Gender and Age

- Females in 1987 accounted for about 54% of FTPS enrolment; this figure has increased by about 2 percentage points since 1976. Females aged 17-19 are almost 50% more likely to be enrolled in college than their male counterparts.

**Participation Rates (% of Selected Population Enrolled as FTPS Students) by Age and Gender, 1987**

| Age | Male | Female |
|---|---|---|
| 17-19 | 6.3 | 9.4 |
| 20-24 | 5.4 | 5.1 |
| 25-29 | 0.8 | 0.9 |
| 30-34 | 0.3 | 0.6 |
| 35+ | 0.1 | 0.1 |

- Between 1976 and 1987 the participation rate of 17-19 year olds increased 36.4%; and the participation rate of 20-24 year olds increased 72.1%, while the participation rate of those aged 25 and over increased by more than 100%.

- The average age of FTPS students is rising. In 1976, those aged 20 and over accounted for 52% of FTPS enrolment; by 1987, this figure had risen to almost 64%.

**Distribution (%) of FTPS College Students by Selected Age Groups**

| Age | 1976 | 1987 |
|---|---|---|
| 17-19 | 48.0 | 36.2 |
| 20-24 | 41.6 | 47.3 |
| 25+ | 10.3 | 16.4 |
| Total | 100.0 | 100.0 |

#### Educational Background of FTPS Students

- In 1987, 64% of FTPS students had completed Grade 12 or part of Grade 13; 15% had completed Grade 13 and 14% had completed or had some other post-secondary education (those with a university background accounted for about one-half of this latter group).

- The proportion of college students with Grade 13 as their highest previous level of educational attainment decreased almost 4 percentage points between 1976 and 1987, while the proportion with Grade 12 or part of Grade 13 increased 3 percentage points over this period.

**Latest Previous Activity of FTPS Students**

- In 1987, 65% of college students had been full-time students immediately prior to enrolling in college and another 27% had been in the labour force. In 1976, the comparable figures were 68% and 26%, respectively.

**Distance of FTPS Students from 'Home'**

- In each year over the period 1976 to 1986, about one-third of college students reported a permanent address which was more than 25 miles from the campus they were attending.

**Colleges, Socio-economic Status, and Occupational Attainment**

- Anisef, Ashbury, and Turrittin in their Ontario study, "Educational Diversity and Occupational Attainment: Are Community Colleges Fulfilling their Promise?," find that:

  "Persons choosing to enter universities or community colleges are different with respect to personal and socio-economic origins. College students are lower in socio-economic status, live in more rural parts of Ontario and come from larger families. University students enter with higher secondary school grades, are bolstered by more encouragement from family and non-family members to pursue studies beyond high school, are more confident of their academic abilities, and develop higher educational and occupational expectations while in their formative high school years."

  "Average job status score differences between university and college entrants appear to grow larger as one moves from earlier to later stages of career attainment. This increasing gap in job status returns would appear to support the class reproduction perspective offered by radical sociologists, the argument that postsecondary institutions serve to sort their students into particular levels of the class structure."

  "While Canadian community colleges may provide a mechanism for transmitting intergenerational inequalities based on class, our analysis demonstrates that the present job status returns to female college entrants are more favorable than to their university counterparts. What we have here are postsecondary educational institutions that recruit particular populations, populations which are not passive recipients of educational programs, but which participate in selection in ways that often affirm traditional and differential gender and class expectations regarding education and occupational goals. In the process some social and occupational mobility both upward and downward is possible."

**Related Background Documents Available at Council of Regents**

College Affairs Branch, Ontario Ministry of Colleges and Universities, Statistical Profile of Ontario Colleges of Applied Arts and Technology, 1989.

Paul Anisef, Fredrick D. Ashbury, and Anton H. Turrittin, "Educational Diversity and Occupational Attainment: Are Community Colleges Fulfilling their Promise?," 1989.

## Determinants of College Participation Rates in Ontario (Project #2)

### Findings

- There is considerable uncertainty about the future levels of college post-secondary enrolment. On the one hand, the population aged 17-24 will decrease in number by almost 10% between 1987 and 2000; and almost 85% of the students in college post-secondary programs fall within this age range. On the other hand, age-specific participation rates (the percentage of a given age group enrolling in college) have varied considerably over time, with the long-term trend being upward; in recent years, however, participation rates of 17-24 year olds have stabilized or even decreased slightly. In addition, between 1987 and 2000, the population aged 25-54 is projected to increase by almost 1,000,000 or 25%, and the participation rate of this group has been increasing.

- While population projections to the year 2000 of those 17 and over are fairly reliable in that future members of this group have already been born, projections of their college participation rates are much more problematic. In an effort to gain some insight into future enrolment trends, David Foot, of the University of Toronto, was asked to undertake an analysis of factors affecting college participation rates and then, if appropriate, to use the results of the analysis to project full-time, college post-secondary enrolment to the year 2000.

- Foot and MacNiven estimated the impact on college participation rates of changes in: (i) real personal disposable income per capita; (ii) real college fees; and (iii) unemployment rates. Economic theory suggests that *increases* in:
  - Real per capita income will *increase* the demand for education; increases in real per capita income increase the individual's ability to finance educational expenditures and also may indicate that the returns to investments in education are increasing.
  - Real student fees will *decrease* the demand for education because such increases raise the relative price of education or the costs of the educational investment.
  - Unemployment rates, all other things being equal, will *increase* the demand for education because higher unemployment rates reduce the opportunity costs of education.

- Their estimation results, based on analyses of historical data covering the periods 1968 to 1987 and 1977 to 1987, are statistically significant and strongly support the economic theories underlying the explanatory model of participation rates described above. In addition, the results indicate that college enrolment is very responsive to income changes, with the elasticity increasing with age; enrolment is, on the other hand, not very responsive to fee changes, with younger students, however, being more responsive to fee changes than older students. The unemployment rate's impact on enrolment, while also statistically significant, does not appear to differ much from one age group to another. Overall the results suggest that the medium to long term trend in participation rates is strongly influenced by the trend in real per capita income, while year to year fluctuations in participation rates about the long run trend are affected by unemployment rates.

- With these results, Foot and MacNiven proceed to project participation rates to the year 2000, using projections of the explanatory variables and the estimated impacts of changes in these explanatory variables on participation rates. In terms of the explanatory variables it is assumed (projected) that: (i) real personal disposable income per capita will, on average, increase 1.1% annually during the 1990s (between 1967 and 1987 average annual growth was 2.6% and during the 1980s it has averaged 1.6%); (ii) *real* college fees will remain at the current level; and (iii) a gradual decline in unemployment rates of approximately 3 percentage points will occur over the 1990s. The per capita income and unemployment rate projections, supplied to Foot by the University of Toronto, essentially describe a "macroeconomy that grows through the early 1990s, suffers a mild growth 'pause' in 1992 and thereafter grows steadily at a somewhat slower rate." (Foot/MacNiven, p.24)

- Given the projections of the explanatory variables, Foot and MacNiven find that participation rates will increase throughout the projection period, with the exception of 1992.

**College Participation Rates by Age Group and Sex: 1988 Actual and 2000 Projected**

| Year | 17-19 Males | 17-19 Females | 20-24 Males (%) | 20-24 Females | 25+ Males | 25+ Females |
|---|---|---|---|---|---|---|
| 1988 | 6.18 | 9.22 | 5.30 | 5.02 | 0.20 | 0.29 |
| 2000 | 7.53 | 10.56 | 7.43 | 7.14 | 0.35 | 0.44 |

- In turn, the projections of participation rates when combined with demographic projections yield the enrolment projections labelled 'Foot' in the following table. For comparative purposes 'Benchmark' projections have been included in this table; the Benchmark projections assume that age-specific participation rates will remain at their current (1988) levels throughout the projection period and thus reflect solely the impact of changing demographics. Both sets of projections use a common set of population projections (i.e., the Ontario Ministry of Treasury and Economics 'reference scenario').

**Full-Time, Post-Secondary College Enrolment Projections, 1989-2000**

| Year | Benchmark Projection | % Change | Foot Projection | % Change |
|---|---|---|---|---|
| (Actual) 1988 | 95043 | - | 95043 | - |
| 1989 | 95857 | 0.9 | 94732 | -0.3 |
| 1990 | 96008 | 0.2 | 95328 | 0.6 |
| 1991 | 95088 | -1.0 | 92766 | -2.7 |
| 1992 | 93721 | -1.4 | 91796 | -1.0 |
| 1993 | 92703 | -1.1 | 95414 | 3.9 |
| 1994 | 92060 | -0.7 | 97926 | 2.6 |
| 1995 | 91346 | -0.8 | 99093 | 1.2 |
| 1996 | 90509 | -0.9 | 101584 | 2.5 |
| 1997 | 90042 | -0.5 | 106078 | 4.4 |
| 1998 | 90068 | 0.0 | 111772 | 5.4 |
| 1999 | 90503 | 0.5 | 117316 | 5.0 |
| 2000 | 90987 | 0.5 | 123545 | 5.3 |

- Both sets of projections show fairly stable enrolment in the early years of the projection period, although enrolment by 1992 is projected to be less than in 1988. Beginning in 1993 the two sets of projections move in quite different directions. The Benchmark projections show moderate enrolment declines, with enrolment in the year 2000 being almost 3% less than in 1992. The Foot/MacNiven projections show significant enrolment increases, with enrolment in the year 2000 being almost 35% more than in 1992.

**Issues/Implications**

- Foot and MacNiven caution the reader that these increases in participation rates may not occur if the projected growth in the economy does not occur and, most importantly, if colleges do not respond adequately to the needs of the 'older' (25+) student. This population group is projected to contribute

about one-half the increase in total enrolment, with their share of college post-secondary enrolment projected to increase from 17% in 1988 to 25% in 2000.

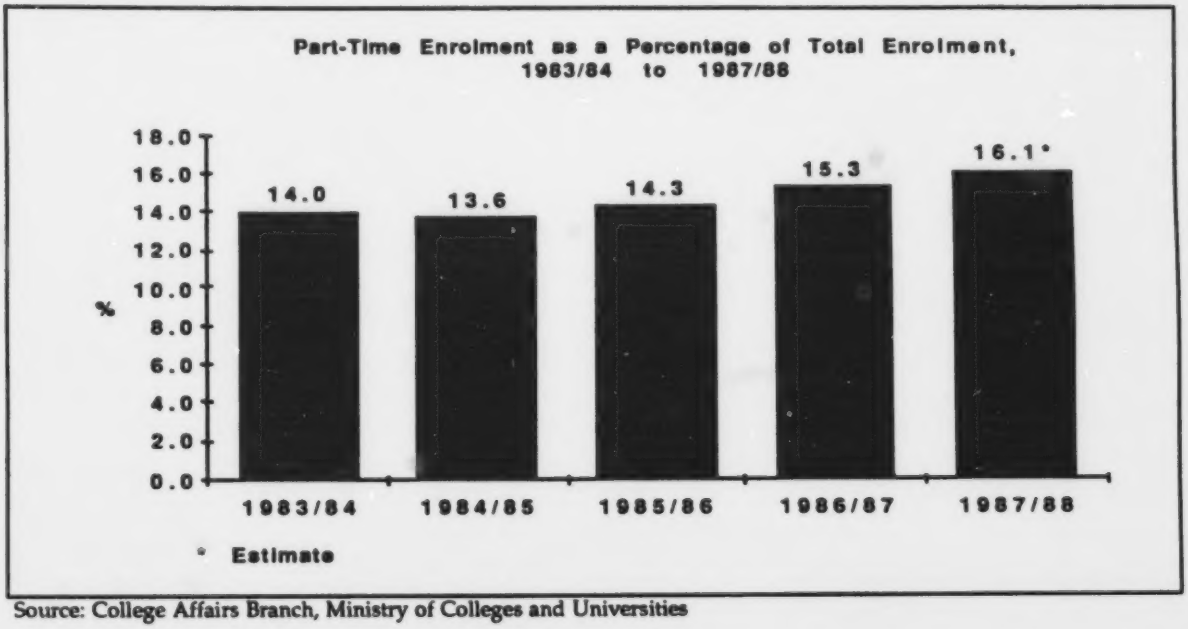
- In concluding their paper, Foot and MacNiven state: "This educational challenge of an aging society will need to be a cornerstone of the community college system in Ontario if it is to realize the full potential of the educational demands reviewed in this study." (p.28)

**Related Background Documents Available at Council of Regents**

David Foot and Maia MacNiven, The Determinants of Enrolment Rates and Enrolments in Ontario Community Colleges, 1989.

## Continuing Education Students: Profiles and Trends (Project #4)

**Part-Time Enrolment Growth**




Source: College Affairs Branch, Ministry of Colleges and Universities

- The 1980s have witnessed growth spurts in both full- and part-time college enrolment. However, the growth rate of part-time enrolment has been larger than that of other major enrolment categories; for example, from 1979 to 1986, full-time post-secondary activity grew 33%, while part-time activity grew 54%.

- In 1987-88, part-time activity constituted 16.1% of total college full-time equivalent enrolment, while in 1983-84 it accounted for 14% of total enrolment.

- When part-time activity is broken down, one finds that non-funded activity (general interest courses and vocational courses for which an external organization controls the entry of students and/or the course completion standards) grew 28% between 1979 and 1986 , while funded part-time activity (vocational courses for which the college controls the 'entry and exit' of students) grew 64%. Non-funded part-time enrolment accounted for about 22% of total part-time enrolment in 1987-88.

- Four major trends in enrolment activity are noted:
  - Full-time post-secondary growth has stabilized in the latter half of the decade
  - Part-time funded activity has demonstrated continued yearly high growth levels.
  - Part-time non-funded activity, which exhibited large growth in the early 1980s, has been increasing only moderately in recent years.
  - Regional shares of part-time funded activity have been quite stable during the 1980s, with the one exception being the Northern region. In 1980-81 the Northern region accounted for 9.1% of provincial part-time funded activity; by 1987-88 its share had fallen to 7.6%.

**General Profile of Part-Time Students at the Colleges**

- The typical part-time student could be male or female (almost equal probability), would be in the 25 to 44 age range and would most likely be taking vocational courses. Participation in part-time activity tends to be higher, the higher one's educational attainment.

**Barriers to Part-Time Learning**

- One of the barriers most often cited by students is the general lack of time to participate in part-time learning. The pressures exerted by a number of situational circumstances (family, work, recreational...) prevent many students from enroling or fully enjoying their studies. College administrators perceive that students face institutional barriers such as class scheduling, course length, and length of time to complete a certificate program.

**Exceptional Practices Occurring in the College System**

- Several types of activities/teaching modes have been designed in an effort to better meet part-time learner needs, including: the Durham Alliance for Training and Education in which a consortium of four post-secondary institutions (three universities and Durham College) have formed a partnership to allow the offering of a broader range of courses in Durham's area and the transferring of credits among the institutions; the offering of university courses at college sites; the use of distance education delivery modes; the targeting of certain groups (e.g., seniors); the scheduling of courses to meet the needs of shift workers; the provision of facilities such as student lounges; and convocations and newsletters.

**Issues/Implications**

- Between 1987 and 2000, the population aged 25-54 is projected to increase 25%. Thus, even without increases in participation rates, one can expect significant increases in the demand for part-time courses. Will the colleges have sufficient physical space to meet the demand, particularly the demand for instruction in the traditional evening hours? Will colleges be able to find ways to provide part-time instruction in 'non-traditional' hours to meet the needs of, for example, shift workers and employed parents with young children? If yes, participation rates may increase significantly, further increasing part-time enrolment.

- If resources (e.g., space) constrain the ability of colleges to meet part-time demand, should colleges restrict their general interest courses to permit the offering of more vocational courses?

- How can (should) a student's life experiences be translated into academic credit?

- What kinds and quality of services/courses will part-time students expect or demand? Is the content of part-time courses presently geared to the needs of adult learners or is it patterned after that developed for the 18 year old day student attending college? Should the content, method of presentation ... be different?

- Should there be parity between part-time and full-time fees or should part-time fees be increased relative to full-time fees?

- If pay equity between part-time and full-time teachers is achieved, who will (should) bear the costs — the part-time student, the taxpayer, both?

- Is there a need to clearly define the respective roles of high schools, colleges, and universities in the area of continuing education? Or, have, in some sense, their roles been 'naturally' defined over time, resulting in both good access and little wasteful competition?

- Does a partnership such as the Durham Alliance provide a good model for enhancing accessibility in locations not served by the full range of post-secondary institutions?

**Related Background Documents Available at Council of Regents**

Teresa Karolewski, Mini-Project #4 - Continuing Education in Ontario's Colleges: Student Profiles, Barriers and Exceptional Practices, 1989.

## Geographic Mobility of Full-Time, Post-Secondary, College Students (Project #6)

**Findings**

- One-third of college students, or about 31,000 students, are attending a college campus which is more than 25 miles from their permanent address (see Table 1). There was little variation in this figure over the period 1976 to 1986. Up to 3.000 of these students are students from outside Ontario, with as many as 1,200 being from Quebec.

- Colleges with the highest percentage of enrolment consisting of students with a permanent address more than 25 miles from campus are: S.S. Fleming (66%); Georgian (63%); Canadore (54%); and Northern (52%). In the case of S.S. Fleming College, the presence of the highly specialized Frost Campus in Lindsay (mainly natural resource programs) contributes to the high percentage of 'non-local' enrolment.

- Colleges with the lowest percentage are: Niagara (18%); Centennial (20%); St. Clair (20%); Durham (21%); Seneca (23%); and George Brown (24%).

- For the most part, colleges in the North have a relatively high percentage of enrolment consisting of students with a permanent address more than 25 miles from campus. This is largely due to the greater distances residents of the North live from a college campus and not due so much to students moving into the North to attend college. A relatively low percentage of enrolment at Metro Toronto colleges consists of students with a permanent address more than 25 miles from campus.

- Nevertheless, a significant percentage of students from outside the Toronto area attend a Toronto area college (Centennial, George Brown, Humber, Seneca, Sheridan). With the exception of students from the Ottawa-Kingston area, at least 5% of each county's college students attend a Toronto area college (see Table 2.)

**Table 1**
**College Students With Permanent Address More Than 25 Miles From Campus**

| College | Location | 1986 Enrolment | # and % of Students with Permanent Address > 25 Miles from Campus | |
|---|---|---|---|---|
| | | | # | % |
| Algonquin | Ottawa | 8,199 | 3,069 | 37.4 |
| Cambrian | Sudbury | 2,699 | 998 | 37.0 |
| Canadore | North Bay | 2,078 | 1,127 | 54.2 |
| Centennial | Scarborough | 6,480 | 1,280 | 19.8 |
| Conestoga | Kitchener | 3,470 | 1,025 | 29.5 |
| Confederation | Thunder Bay | 2,398 | 1,072 | 44.7 |
| Durham | Oshawa | 2,588 | 554 | 21.4 |
| Fanshawe | London | 5,920 | 2,877 | 48.6 |
| George Brown | Toronto | 6,369 | 1,512 | 23.7 |
| Georgian | Barrie | 2,404 | 1,588 | 66.1 |
| | Orillia | 567 | 331 | 58.4 |
| | Owen Sound | 388 | 184 | 47.4 |
| | (Total) | 3,359 | 2,103 | 62.6 |
| Humber | Etobicoke | 7,194 | 2,152 | 29.9 |
| Lambton | Sarnia | 1,166 | 330 | 28.3 |
| Loyalist | Belleville | 2,125 | 1,000 | 47.1 |
| Mohawk | Hamilton | 6,357 | 1,727 | 27.2 |
| Niagara | Welland | 3,368 | 616 | 18.3 |
| Northern | South Porcupine | 665 | 298 | 44.8 |
| | Kirkland Lake | 387 | 207 | 53.5 |
| | Kapuskasing | 59 | 14 | 23.7 |
| | Moosonee | 69 | 69 | 100.0 |
| | Haileybury | 114 | 88 | 77.2 |
| | (Total) | 1,294 | 676 | 52.2 |
| St. Clair | Windsor | 3,101 | 570 | 18.4 |
| | Chatham | 530 | 153 | 28.9 |
| | (Total) | 3,631 | 723 | 19.9 |
| St. Lawrence | Brockville | 594 | 228 | 38.4 |
| | Kingston | 2,230 | 878 | 39.4 |
| | Cornwall | 980 | 349 | 35.6 |
| | (Total) | 3,804 | 1,455 | 38.2 |
| Sault | Sault Ste. Marie | 1,374 | 571 | 41.6 |
| Seneca | North York | 9,007 | 2,042 | 22.7 |
| Sheridan | Oakville | 6,425 | 1,775 | 27.6 |
| S.S. Fleming | Peterborough | 2,329 | 1,242 | 53.3 |
| | Lindsay | 1,194 | 1,098 | 92.0 |
| | (Total) | 3,523 | 2,340 | 66.4 |
| | **System Total** | **92,828** | **31,024** | **33.4** |

Source: College Affairs Branch, MCU, Statistical Profile of Ontario Colleges of Applied Arts and Technology, 1989.

**Table 2**
**Proportion of Each County's Students Enrolled at Selected Colleges, 1987**

| County | Primary College* | % of County's Students Attending Primary Colleges | % of County's Students Attending 5 Toronto Colleges** | % of County's Students Attending Remaining Colleges | Total |
|---|---|---|---|---|---|
| **North** | | | | | |
| Algoma | Sault | 54.1 | 10.2 | 35.7 | 100.0 |
| Cochrane | Northern | 49.2 | 6.9 | 43.9 | 100.0 |
| Kenora | Confed. | 70.1 | 7.0 | 22.9 | 100.0 |
| Manitoulin | Cambrian | 70.4 | 9.3 | 20.3 | 100.0 |
| Nipissing | Canadore | 65.4 | 5.9 | 28.7 | 100.0 |
| Parry Sound | Canadore | 31.4 | 21.0 | 47.6 | 100.0 |
| Rainy River | Confed. | 71.0 | 6.4 | 22.6 | 100.0 |
| Sudbury | Cambrian | 52.5 | 7.0 | 40.5 | 100.0 |
| Sudbury R. M. | Cambrian | 75.2 | 7.1 | 17.7 | 100.0 |
| Thunder Bay | Confed. | 82.8 | 5.8 | 11.4 | 100.0 |
| Timiskaming | Northern | 44.1 | 8.0 | 47.9 | 100.0 |
| **East** | | | | | |
| Frontenac | St. Lawrence | 78.5 | 4.3 | 17.2 | 100.0 |
| Lanark | St. Lawrence | 35.3 | 9.4 | 55.3 | 100.0 |
| Leeds/Gren | St. Lawrence | 60.8 | 5.8 | 33.4 | 100.0 |
| Lennox/Add | St. Lawrence | 45.3 | 6.3 | 48.4 | 100.0 |
| Ottawa/Carl | Algonquin | 89.1 | 4.3 | 6.6 | 100.0 |
| Prescott/Russ | Algonquin | 64.0 | 2.4 | 33.6 | 100.0 |
| Renfrew | Algonquin | 54.8 | 8.6 | 36.6 | 100.0 |
| Stor/Dun/Glen | St. Lawrence | 66.1 | 5.0 | 28.9 | 100.0 |
| **Southwest** | | | | | |
| Elgin | Fanshawe | 57.6 | 12.2 | 30.2 | 100.0 |
| Essex | St. Clair | 86.2 | 5.1 | 8.7 | 100.0 |
| Huron | Fanshawe | 33.6 | 14.2 | 52.2 | 100.0 |
| Kent | St. Clair | 49.4 | 8.5 | 42.1 | 100.0 |
| Lambton | Lambton | 58.0 | 7.8 | 34.2 | 100.0 |
| Middlesex | Fanshawe | 77.8 | 8.0 | 14.2 | 100.0 |
| Oxford | Fanshawe | 45.7 | 16.5 | 37.8 | 100.0 |
| Perth | Fanshawe | 36.8 | 16.0 | 47.2 | 100.0 |
| Waterloo | Conestoga | 64.0 | 17.7 | 18.3 | 100.0 |
| Wellington | Conestoga | 41.4 | 31.5 | 27.1 | 100.0 |
| **Niagara** | | | | | |
| Brant | Mohawk | 49.4 | 19.3 | 31.3 | 100.0 |
| Hald/Nor | Mohawk | 37.6 | 24.4 | 38.0 | 100.0 |
| Niagara | Niagara | 61.7 | 15.7 | 22.6 | 100.0 |
| Wentworth | Mohawk | 74.0 | 17.2 | 8.8 | 100.0 |
| **E. Central** | | | | | |
| Durham | Durham | 59.4 | 27.0 | 13.6 | 100.0 |
| Haliburton | S.S. Fleming | 39.7 | 38.4 | 21.9 | 100.0 |

... continued

| County | Primary College* | % of County's Students Attending Primary Colleges | % of County's Students Attending 5 Toronto Colleges** | % of County's Students Attending Remaining Colleges | Total |
|---|---|---|---|---|---|
| Hastings | Loyalist | 67.0 | 8.3 | 24.7 | 100.0 |
| Northumber | S.S. Fleming | 28.3 | 19.7 | 52.0 | 100.0 |
| Peterborough | S.S. Fleming | 76.5 | 10.6 | 12.9 | 100.0 |
| Princ Edward | Loyalist | 57.8 | 13.9 | 28.3 | 100.0 |
| Victoria | S.S.Fleming | 56.4 | 16.7 | 26.9 | 100.0 |
| **Central** | | | | | |
| Bruce | Georgian | 34.9 | 19.5 | 45.6 | 100.0 |
| Grey | Georgian | 39.0 | 29.6 | 31.4 | 100.0 |
| Muskoka | Georgian | 38.5 | 30.7 | 30.8 | 100.0 |
| Simcoe | Georgian | 63.4 | 24.7 | 11.9 | 100.0 |
| **Toronto** | | | | | |
| Dufferin | Sheridan | 31.9 | 64.6 | 35.4 | 100.0 |
| Halton | Sheridan | 54.7 | 72.2 | 27.8 | 100.0 |
| Metro Toronto | Seneca | 34.8 | 96.1 | 3.9 | 100.0 |
| Peel | Sheridan | 51.9 | 94.0 | 6.0 | 100.0 |
| York R. M. | Seneca | 47.7 | 90.1 | 9.9 | 100.0 |
| **System Total** | | | 38.5 | | |

* The primary college is the one attended by the largest percentage of students.

** The five Toronto colleges are: Centennial, George Brown, Humber, Seneca, and Sheridan.

Source: Nicholas Yarmoshuk, Geographical Mobility of Ontario College Students, 1983-87, 1989.

| % of County's Students Attending a Toronto Area College | Number of Counties |
|---|---|
| < 5.0 | 3 |
| 5.0 to 9.9 | 19 |
| 10.0 to 14.9 | 5 |
| 15.0 to 19.9 | 9 |
| 20.0 to 24.9 | 3 |
| 25.0 to 29.4 | 2 |
| 30.0 to 34.9 | 1 |
| >35 | 6 |

- About 95% of students from Peel, York R.M., and Metro Toronto attend a Metro Toronto college.
- Students from certain areas in the north appear to enrol in disproportionate numbers at Algonquin College in Ottawa. For example, 11% of students originating from the Cochrane area attended Algonquin in 1987.

**Issues/Implications**

- While the data do no not allow one to determine what proportion of the students attending a campus more than 25 miles from their permanent address are commuting from their permanent address and what proportion have actually moved in order to attend college, it would appear that there are significant numbers of students who move when attending college.

- College students display greater geographic mobility in terms of their selection of college than one might have expected given the emphasis placed on 'community' when colleges first opened.

- The mobility of students would appear to be affected by factors such as: i) the 'attraction' of Toronto, in terms of future employment prospects, range of programs available, and the city itself ; (ii) the 'uniqueness' of certain programs offered at some colleges; and (iii) the availability of instruction in the french language.

- Recent decisions by several colleges to build student residences should increase the geographic mobility of college students

**Related Background Documents Available at Council of Regents**

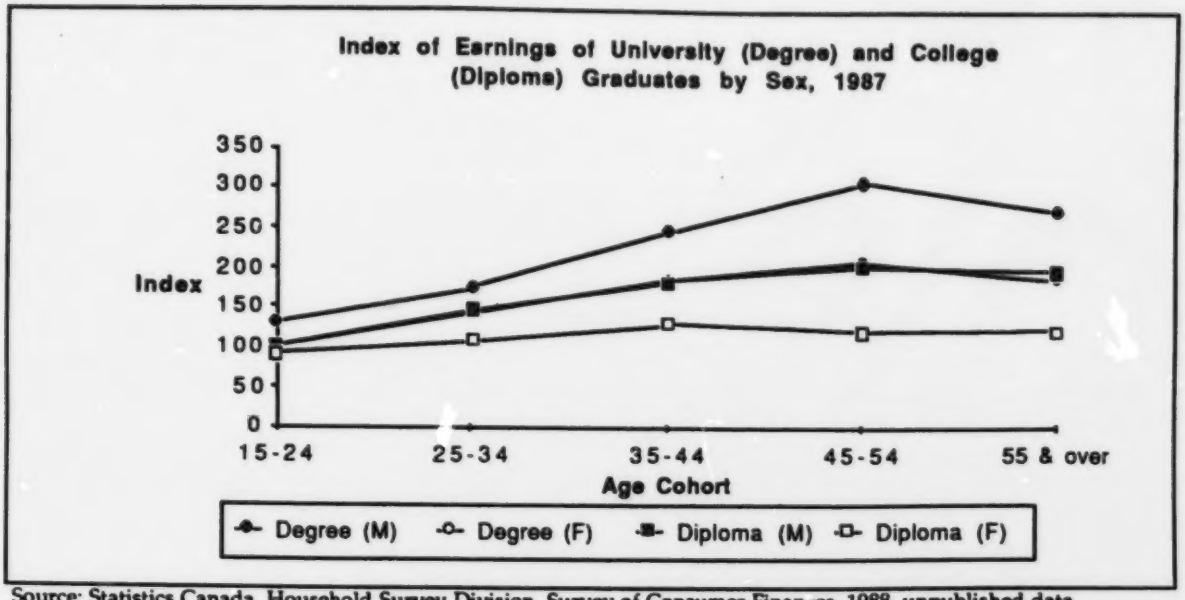
Nicholas Yarmoshuk, Geographical Mobility of Ontario College Students, 1983-87, Sir Sandford Fleming College of Applied Arts and Technology, 1989.

## Employment of College Graduates: A Comparison of College and University Graduates' Earnings and Employment in Ontario (Project #18)

**Findings**

- The chart shows the age-earnings curve of college and university graduates by sex and reflects the commonly held notion that both sex and educational attainment affect earnings. The chart is based on earnings data of full-year, full-time workers in 1987.

- Male university graduates have higher starting salaries than other graduates and the difference increases with age until about age 55. Males with college diplomas and females with university degrees have very similar age-earnings profiles; for those less than 25 years old, members of both groups tend to earn about 77% of that of their university male counterparts; in the age range 45 to 54 they earn about 66%. Females with college diplomas have the lowest earnings upon graduation and their earnings exhibit the least growth with age; female college graduates under 25 years old earn about 70% of that of male university graduates of comparable age; in the age range 45-54 the comparable figure is 40%.




Source: Statistics Canada, Household Survey Division, Survey of Consumer Finances, 1988, unpublished data.

- 14% of 1982 college graduates who were working in 1987 held jobs which were unrelated to their area of study; for university graduates at the bachelor degree level the comparable figure was 13%. While these figures are very similar, the data indicate that college graduates are more likely (almost 50% more likely) to find directly related employment within the first year or two after graduation than university graduates.

**Issues/Implications**

- College graduates appear to do quite well in terms of employment and earnings immediately upon graduation. However, relative to university graduates, college graduates do not experience as much growth in earnings over their careers. This slower growth may in part be due to the fact that certain occupations are necessarily characterized by fewer opportunities for career advancement and these may be occupations for which colleges are the main suppliers of trained labour. It may also be the case, however, that college graduates, on average, are not viewed by employers as being as suitable as university graduates for on-the-job training investments.

- As we enter the 21st century, the increasing scarcity of labour, combined with changing/advancing methods of production, will likely mean that employers will be increasingly seeking employees who 'know how to learn.' If this occurs and if college graduates are not viewed as good risks for on-the-job training investments, then the earnings differentials between college and university graduates may further widen, and real economic growth will be less than it might have been.

**Related Background Documents Available at Council of Regents**

Craig McFadyen, Mini-Project #18 - The Employment of College Graduates: A Comparison of College and University Graduates' Earnings and Employment in Ontario, 1989.

## Post-Secondary Student Attrition in Ontario's College System (Project #17)

### Findings

- Attrition rates for those entering the college system from 1976 to 1984 were examined. The attrition rates of the 1982 college entry cohort which are shown in the following table are typical of the rates throughout this period.

**Attrition Rates by Division and Duration of Program**
**Fall, 1982, Entry Cohort**

| | 1 Year Programs | 2 Year Programs | 3 Year Programs | Total |
|---|---|---|---|---|
| Applied Arts | 35.1 | 40.6 | 54.7 | 43.5 |
| Business | 30.4 | 45.1 | 47.6 | 44.4 |
| Health | 18.4 | 22.7 | 22.9 | 21.8 |
| Technology | 23.6 | 46.1 | 46.6 | 45.6 |
| Total | 26.8 | 42.8 | 44.0 | 41.7 |

Source: Ontario College Information System

- For those entering the college system during the period 1976 to 1984, it is estimated that 43% did not graduate, at least not before December, 1988.

- Attrition tended to be higher among:

  - Males

    *Males were 40% more likely to withdraw than females.*

  - Those who have not completed Grade 13

    *Grade 12 graduates were 39% more likely to withdraw than Grade 13 graduates*

  - Those attending larger colleges

    *Students attending larger colleges were about 10% more likely to withdraw than students attending smaller colleges.*

  - Those enroled in applied arts, business, and technology programs (i.e., non-health science programs)

    *Students in these divisions were twice as likely to withdraw as students in health sciences.*

  - Those enroled in two and three year programs

    *Attrition rates for students in two and three year programs tended to be about 60% higher than for students in one year programs.*

  - Those in their first year of studies

    *For students in two year programs, 72% of withdrawals occurred prior to second year; for students in three year programs about 60% of withdrawals occurred prior to second year.*

  - Those students with at least one parent with some post-secondary education

    *Attrition rates of students with parent(s) with post-secondary education tended to be higher than those of students from families with no post-secondary education, although*

*the amount by which these rates differed from one cohort to another varied considerably, and in some years the difference was relatively insignificant.*

Note: These findings, taken from the study (1983) of R. A. Stoll and E. Scarff on student attrition in Ontario's colleges, while suggestive, should not be used to draw explicit conclusions about the causes of attrition.

- Attrition rates in the Ontario college system appear to be comparable to those in the United States, where college attrition rates typically fall within the range of 45 to 50%. (See Stoll and Scarff study.)

- While there is not a definitive study of the causes of attrition in Ontario's colleges, academic 'underpreparedness' of students was cited as a major factor contributing to attrition in an ACCATO survey (1988) of student retention strategies of Ontario's colleges.

**Issues/Implications**

- While attrition rates in Ontario may be no higher than those in other jurisdictions and not all attrition should be viewed as 'bad,' several issues arise given the high rates of attrition, namely:

  - Can attrition rates be lowered in a cost-effective manner without resorting to increases in admission standards? If no, should accessibility (entry to college programs) be sacrificed (limited) in the name of 'efficiency?'
  - Assuming attrition rates can be reduced in a cost-effective manner without reducing accessibility, what are the key elements of an attrition reduction strategy?
    - greater articulation between colleges and secondary schools?
    - more remedial and preparatory programs in the colleges?
    - more counselling services in the colleges?
    - other elements?
  - What explains the lower rates of attrition in Health Science programs?
    - enrolment quotas in Health Science programs resulting in higher admission standards?
    - occupational specificity of training?
    - other factors?

**Related Background Documents Available at Council of Regents**

Howard Rundle, Mini -Project #17 - Student Attrition in the College System, 1989.

George Radwanski, Ontario Study of the Relevance of Education, and the Issue of Dropouts, Ontario Ministry of Education, 1988.

R. A. Stoll and E. Scarff, Student Attrition from Post-Secondary Programs at the Ontario Colleges of Applied Arts and Technology, Ontario Ministry of Colleges and Universities, March, 1983.

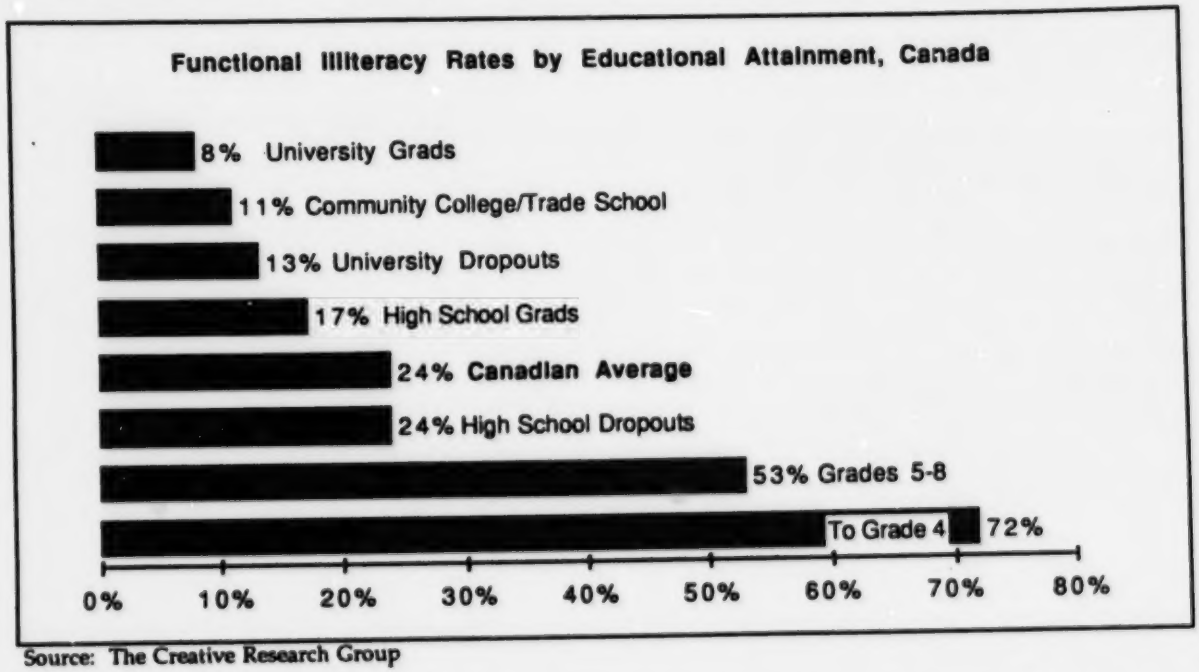
Survey of Student Retention Strategies, ACCATO, 1988.

## Literacy and the Colleges (Project #28)

### Findings

- The Southam News study, Literacy in Canada " A Research Report" (1987), concluded that one in six working Canadians is functionally illiterate, and 17% of high school graduates are functional illiterates.

- Immigrants to Canada are more likely to be illiterate (35%) than native-born Canadians (22%). However, the first generation offspring of Canadian immigrants achieve literacy levels similar to or better than second and subsequent generations of Canadians. (Southam)




Source: The Creative Research Group

- While a systematic study of literacy levels of entrants to college post-secondary programs has not been undertaken, increasingly colleges are indicating that a not insignificant number of entrants have less than adequate literacy skills.

- Currently MCU does not fund colleges for a specific preparatory semester for post-secondary students who lack the basic literacy and numeracy skills required to complete their programs.

- In the fall of 1986 the Government of Ontario launched its Plan for Adult Basic Literacy in which it encouraged four ministries (MSD, MCU, MOE, and Citizenship and Culture) to work together in boosting Ontario's literacy level. However, concerns have been expressed that competition for scarce funds has limited the extent to which these agencies and others are able (willing) to cooperate, and better coordination of efforts remains elusive.

### Issues/Implications

- Should colleges as a matter of course administer literacy and numeracy tests to post-secondary applicants? Would, for example, new immigrants view such tests as being discriminatory?

- What should be the colleges response to applicants to post-secondary programs who do not possess the necessary literacy and numeracy skills, particularly if these applicants are high school graduates? Should the colleges offer admission conditional on the student upgrading these skills or should the offer be unconditional?

- From where should college students/applicants requiring assistance seek assistance? Should it be the colleges who provide remedial programs? The high schools? Voluntary organizations?

- If colleges were to provide remedial literacy and numeracy programs to high school graduates who have applied for admission to post-secondary programs, what would be the resource requirements?

- In addition to post-secondary students, what should be the role, if any, of colleges in literacy and numeracy training of adults? Should it extend beyond ESL programs?

**Related Background Documents Available at Council of Regents**

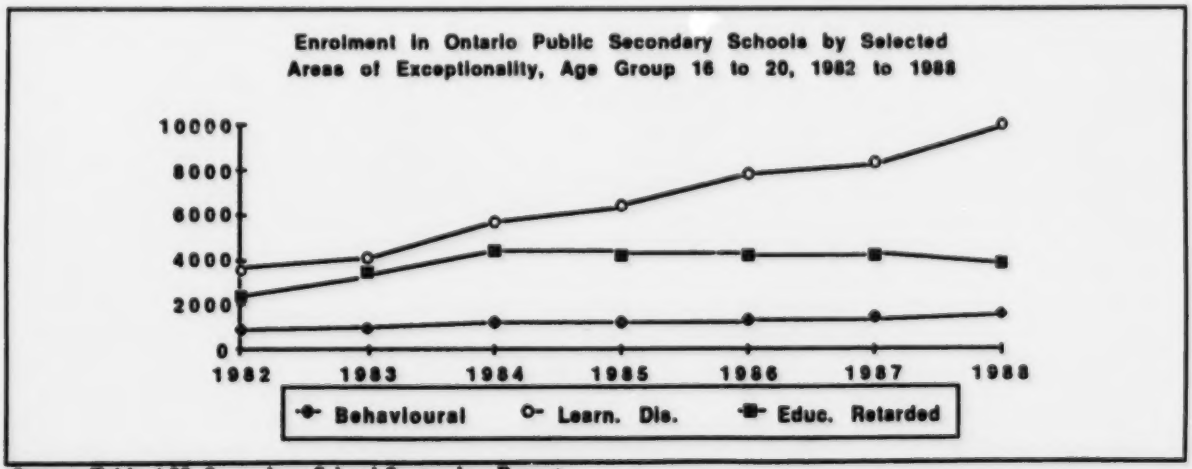
Bob Bernhardt, Mini -Project #28 - Literacy and Numeracy Skills of Students Entering College Programs, 1989.

## Colleges and Special Needs Students (Project #11)

**Findings**

- Section 15 of the Canadian Charter of Rights and Freedoms and the Ontario Human Rights Code (Sections 10, 16, and 23) ensure the rights of all citizens as fully enfranchised members of society; and by the introduction of Bill 82 (the Education Amendment Act), the Government of Ontario has provided legislation designed to increase access by exceptional students to publicly-funded secondary school education in Ontario.

- Since the enactment of Bill 82 in 1985, there has been a significant increase (more than 20%) in the number of public secondary school students *identified* as being exceptional. Of the roughly 20,000 exceptional pupils, aged 16 to 20, attending public secondary schools in Ontario in 1988, almost 50% were learning disabled; about 20% were gifted; 18% were educable retarded; and 9% were behavioural; the remaining students were identified as being autistic, hearing impaired, speech and language impaired, visually impaired, orthopedic, or multiple handicapped.




Source: Table 4.80, Secondary School September Report

- While applications from exceptional students for places in the college system undoubtedly will increase, the impacts of Bill 82 and other factors on this demand are difficult to forecast with any precision. Demand for college places will be influenced by the range of college programs and support services which are readily accessible to special needs students and the range of services provided by other suppliers of training.

- The barriers to access most frequently identified by special needs students are physical and negative attitudes. In addition, financial and program delivery barriers are experienced. Physical barriers range from the lack of ramps or elevators to the absence of devices for access of the visually and hearing impaired. As well, limited availability of human resources such as counsellors, tutors, and interpreters decreases access. Lack of awareness by educational staff of the needs of exceptional students and of teaching strategies for meeting these needs adversely affect their attitude toward special needs students. Financial barriers for special needs students seem to range from simply inadequate student assistance in total (particularly for special needs students attending on a part-time basis) to lengthy time delays in approval of applications for assistance to the multiplicity of government departments who may be involved in providing one form of assistance or another. Program delivery barriers include a lack of availability of part-time programs or more generally a lack of programs which permit students to proceed at a pace appropriate to their capabilities, and a lack of flexibility in examination methods.

- The college system and the government are making efforts to reduce some of these barriers. For example, the College Committee on Special Needs in cooperation with the Association of Colleges of Applied Arts and Technology of Ontario has produced the Handbook for Success: Special Needs (1988), a resource which may be used by college personnel involved with special needs students; and the Ministry of Colleges and Universities has targeted funds ($3.5M annually at present) to support the provision of special needs services at all colleges; with these funds college are establishing a Special Needs Offices to coordinate services and accommodations for special needs students — such services will include pre-admisssion counselling and job placement assistance. In addition, colleges are involved in the Special Education Pilot Project with Brock University; this project is aimed specifically at training special needs counsellors and faculty at the post-secondary level.

**Issues/Implications**

- Given Bill 82, exceptional secondary school students will increasingly have higher and higher expectations of the college system.

- Given that the colleges, community groups, private trainers, and industry all provide post high school vocational training to special needs students, what should be the colleges' role? What partnerships should be developed between colleges and industry to benefit special needs students? Given the many Ministries involved in providing services to those with special needs, how can their efforts be better coordinated?

- For which programs and services for special needs students would institutional specialization within the college system be the most effective means for meeting their needs? Responses to both the 1986 College President's Task Force Report of College Services to Special Needs Students and a 1988 OCUA survey indicated that institutional specialization according to disability should *not* be encouraged; it would limit student choice and accessibility. Nevertheless, there may be cases in which specialization represented a more effective and/or efficient route to follow. An examination of institutions such as Gallaudet University, a university for the deaf in the United States, might assist in clarifying the specialization issue.

- The Atlantic Centre of Support for Disabled Students, located at Saint Mary's University, has initiated work, in cooperation with all education institutions in the region, to assess the needs of students with particular disabilities and to determine the size of of the population requiring special attention. Would such a centre in Ontario assist with policy and program development?

**Related Background Documents Available at Council of Regents**

Beth Thorsen, Mini-Project #11, The College Communities: Special Needs, 1989.

## Student Services: Meeting Students' Needs For Access and Success (Project #13)

- The College Committee on Student Affairs (CCSA) submitted to Vision 2000 a paper which describes, from its perspective, some of the most important barriers limiting *access* to and *success* in college programs; the paper also suggests ways in which these barriers may be reduced. This 'Highlights' report is a brief summary of the CCSA paper.

- Adult illiteracy is raised as a major concern and barrier to training. The CCSA urges "the government to give the mandate for redressing the problems of illiteracy to one of the educational 'systems'."

- In addition to the 'illiterate population,' specific groups are felt not to be accessing the colleges to the extent that one would expect or hope; these include: basic and general level graduates; the learning disabled and other students with special needs; and native students.

- Barriers to access cited by CCSA include: the level of student financial assistance; a lack of flexibility in part-time programming; a lack of affordable child care; confusion about what programs are available and what they are about; a lack of formal recognition of 'life experience' for the mature student; the restricted ability to provide student services during evenings and weekends due to funding constraints; and a lack of sensitivity on the part of college staff to the needs of specific populations.

- In terms of "facilitating and maximizing student development and success" the CCSA stresses the need for "a holistic view of student growth (which) recognizes the essential value and importance of the learning that the student is afforded outside of the classroom walls." "An end must be put to the narrow attitude that service agents are less than necessary as opposed to integral to the student experience and academic support."

- To promote appropriate program selection by students the CCSA recommends that the college system research and develop 'diagnostic' tests; the progress of 'high risk' students should be carefully followed so that remedial action may be undertaken as soon as required — tracking systems need to be developed and implemented.

**Related Background Documents Available at Council of Regents**

College Committee on Student Affairs, Access and Success (A Submission to Vision 2000), 1989.

## Distribution of College Students by Discipline Area and Labour Market Needs (Project #7)

### Findings

- The major objective of this project was to shed some light on the question: Do college students' enrolment decisions with respect to field of study match up well with labour market needs? Of particular interest was the relationship between enrolment in technology programs and labour market conditions.

- Between 1983 and 1987, enrolment in technology programs decreased 19.5%; enrolment in other full-time post-secondary programs increased 8.6%.

- Over the same period, the percentage of technology graduates available for work obtaining employment related to their field of study increased from 56.0% to 82.9%, a 48% increase.

- At first glance one might conclude that statistics such as these suggest that technology enrolment is not very responsive to labour market conditions: enrolment in both absolute and relative terms fell during a period in which the probability of obtaining related employment increased.

- But, two factors should be noted, namely: (i) **throughout the period 1983-86 the probability of technology graduates obtaining related employment was below that of graduates of other fields,** and by as much as 10-15 percentage points in 1983 and 1984. Only in 1987 did the probability of technology graduates obtaining related employment match that of graduates of other fields; thus, even if instantaneous response to labour market conditions were possible on the part of students, one would have expected that technology enrolment would have suffered relative to enrolment in other programs at least through 1986; and (ii) **the time which elapses between the decision to enter a particular college program and entry into the labour market.** The decision to position oneself for admittance to a technology program is often made early in high school through selection of high school courses. Thus, given the recession of 1982 and its very adverse and fairly prolonged impact on employment prospects for technology graduates, it is not surprising that technology enrolment fell again in 1987; this is consistent with students' college-related educational decisions being affected by the state of the labour market a few years prior to actual entry into a college program. (Enrolment in technological studies in the secondary schools as a percentage of total enrolment declined considerably between 1983 and 1986.)

- If the likelihood of a technology graduate obtaining related employment continues, beyond 1987, to match that in other fields, then one would expect to observe technology enrolment to soon begin to grow at about the same rate as enrolment in other fields. Preliminary enrolment figures for 1989 suggest this is occurring; in 1989 technology enrolment has increased 3.9%, while total system enrolment has increased 3.3% over the previous year's level.

- While our analysis of the sensitivity of students to labour market conditions is impressionistic at best, American studies of a much more 'scientific' and detailed nature, support the conclusion that college students are fairly responsive to labour market conditions when selecting a field of study. See, for example, Richard B. Freeman: (i) The Market for College-Trained Manpower, Harvard University Press, 1971; and (ii) The Over-Educated American, Academic Press, 1976.

- Other factors — non-economic factors — have been brought forward to explain the decline in technology enrolment during the 1980s. These relate to concerns about: (i) the level of knowledge of technical occupations of many high school teachers and guidance counsellors; (ii) the adequacy of math and science programs in our elementary and secondary schools; (iii) parental and societal attitudes towards

technical occupations; and (iv) the marketing of technology programs to high school students by the colleges themselves.

- Undoubtedly each of these factors and others affect the decision to enrol in technology programs and efforts need to be made to overcome the concerns noted above. But even if improvements were made in these areas, one would likely still observe recurring shortages and surpluses of college graduates in technology and other fields. As long as (i) college students are fairly responsive to labour market conditions and (ii) the time which elapses between the decision to enter a program and graduation from a program is several years, one can expect labour shortages followed by labour surpluses on a fairly regular basis.

- Another concern related to declining technology enrolment is that there is the impression that colleges have lowered their admission standards and/or program standards in an effort to maintain enrolment and avoid cancellation of technology programs.

**Issues/Implications**

- If one accepts the notion that college students in selecting a field of study are fairly responsive to labour market conditions, then there are actions which might be undertaken to reduce the magnitude of shortages and surpluses in particular occupational fields. For example: scholarships might be used to attract students into fields in which shortages are anticipated; if college training became more general in nature (i.e., if students acquired skills which were more transferable from one occupation to another), then the adaptability of college graduates to changing labour market conditions should improve, provided that employers were able and willing to increase their specific skills training; and the chronological time it takes to train an individual in a particular field could be shortened if the school year were lengthened.

- In what discipline areas, if any, these actions should be undertaken depends on the impact of labour market imbalances. For example, in some technology-related occupations a small shortage of skilled technologists may represent a major 'bottleneck' to production, while a small shortage in other occupations may have little impact on production.

- The government may wish to designate certain programs as priority programs and provide these programs sufficient funding to allow them to operate effectively in times of declining enrolment. If this were done, the pressure to lower admission and program standards would lessen during such periods.

**Related Background Documents Available at Council of Regents**

Robert Bernhardt, Distribution of College Students by Discipline Area and Current Labour Market Needs, 1989.

## Future Educational/Training Requirements of Ontario's Population (Project #8)

**Findings**

- The future educational/training needs of Ontario's population will be influenced by significant demographic changes and significant changes in the skills requirements of Ontario's economy.

- The key demographic changes over the next ten years will be: (i) a decrease in the number of young people entering the labour force, at least through to the year 2000; the population aged 17 to 24 is projected to decrease by almost 120,000 or 10% between 1987 and 2000; (ii) a large increase in the number of middle-aged workers; between 1987 and 2000, the population aged 25-54 is projected to increase by almost 1,000,000 or 25%; (iii) a less rapid increase in the growth of female labour force participation

rates; (iv) a substantial increase in the seniors' population; those aged 65 and over will increase by 42% between 1987 and 2000, and by a further 26% between 2000 and 2011; and (v) changing immigration patterns, with net migration to Ontario projected to decline and new immigrants to Ontario increasingly coming from 'non-traditional' sources (e.g., Asia, Africa, Central and South America).

- As a result of these demographic changes, Ontario's economy should shift from a situation of labour surpluses and a relatively young labour force, which characterized most of the past two decades, to labour shortages and a noticeably aging labour force.

- Key factors likely to alter the nature of skills required in our economy include: (i) the pressures of international competition; (ii) technological change; and (iii) the introduction of new organizational structures within the workplace.

- Calls for a restructuring of the Ontario economy are increasingly being heard. There is concern that unless Ontario intensifies its efforts to generate income through trade of manufactured goods, the growth of the service sector, including both commercial services (e.g., finance, communications...) and social/consumption services (e.g., health, education, and leisure services), will be severely constrained. And growth in income through trade is felt to be highly dependent on research and development, activities in which Canada lags behind other industrialized countries; in 1987, Canada spent 1.3% of its GDP on R&D, while countries such as Japan and Sweden were spending more than twice this percentage.

- International competition and technological change will, for many, mean several significant job changes within the course of their working lives.

- Critical labour supply shortages in some industrial trades already exist and concerns are being raised about potential shortages of highly-qualified employees in technology-oriented occupations.

- The desired entry-level skills for the semi-skilled and unskilled worker, currently at the Grade 12 level, are expected to continue to rise. Numeracy, literacy and communication skills are increasingly becoming essential prerequisites for entry to the labour force.

- And as stressed by the MIT Commission on Industrial Productivity, there will be a need to: cultivate a more involved, less specialized, continuously learning work force; form product teams within firms to integrate and (where feasible) perform concurrently the functions of research and development, product design, and process design to achieve greater efficiency and a shorter time to market; flatten organizational hierarchies to give employees greater responsibility and broader experience; to have key employees develop an adequate understanding of foreign cultures. (See pp.147-155, MIT Commission on Industrial Productivity, Made in America - Regaining the Productive Edge, The MIT Press, 1989.)

**Issues/Implications**

- The changing demographics and skills requirements of the economy raise several questions related to future educational and training strategies within Ontario.

  What role should Ontario's colleges play in the training of the older worker? What changes in teaching methodologies, program content and duration, and scheduling may be required? What role should industry play in the training of the older worker?

  What role should the colleges play with respect to the high school dropout? With respect to the Grade 12 general graduate who has entered a college post-secondary program but is lacking the literacy and numeracy skills one would expect of a Grade 12 graduate?

What curriculum changes may be required in college post-secondary programs? Should, for example, **team projects** and courses on **other cultures/languages** become a component of most programs? Should the number of **co-op programs** be expanded as a means to instill more positive attitudes about life-long learning ?

Should colleges focus on the provision of **portable skills** (i.e., skills which are applicable in several occupations and which provide a foundation for further acquisition of skills ) and leave the more specific job-skills training to industry? If colleges moved in this direction, would students show the same willingness to attend college or is it the very job specific skills which they are seeking?

Should colleges become more involved in **applied research** in, for example, the engineering technology field? Is there a danger that the critical mass of resources necessary for successful research activities would be less likely to materialize if limited research resources were spread across not only business, industry, universities, and government, but, also, the colleges?

Will traditional **market forces** be sufficient to attract enough competent individuals into trades and technology training? Or are social biases against trades and technology occupations such that market forces will not be sufficient? Do our **apprenticeship programs** and trades regulations require a major revamping? Do high school and college **technology programs** require a major revamping?

Should colleges attempt to simultaneously perform **functions ranging from** providing basic job readiness training at one end of the spectrum to advanced training and applied research in technical fields at the other end of the spectrum?

**Related Background Documents Available at Council of Regents**

This highlight document was prepared in part on the basis of unpublished notes provided to Study Team 1 by officials from the Premier's Council. The interested reader is referred to current and future publications of the Premier's Council and to The MIT Commission on Industrial Productivity, Made in America - Regaining the Productive Edge, The MIT Press, 1989.

## Regional Distribution of Enrolment by Program and Breadth of Programming by Region (Project #9)

**Findings**

- This project assesses the extent to which enrolment is concentrated in various regions of the province in any of the occupational groups for which colleges provide programs. It also examines the breadth of programming offered in each region.

- To determine whether enrolment in an occupational field was concentrated in particular regions, it was arbitrarily defined that enrolment concentration was considered 'high' if a region's share of system enrolment in a particular occupational/program field was more than twice the region's share of total system enrolment. College programs were grouped into 51 fields, of which 14 were technology-related, 16 business-related, 17 were in the applied arts field, and 4 were in health.

- The analysis was conducted in terms of the six 'economic' regions of Ontario, namely: Northwest (Confederation); Northeast (Cambrian, Canadore, Northern, Sault); Eastern (Algonquin, Loyalist, St. Lawrence); Central (Conestoga, Georgian, Mohawk, Niagara, S. S. Fleming); and Metro Toronto (Centennial, Durham, George Brown, Humber, Seneca, Sheridan). Table 1 shows the results.

- The results indicate that the selection of programs by students is positively related to their region's industrial/occupational structure. For example: enrolment in the two northern regions is *'concentrated'* in technology programs related to the resource-based industries in the regions; enrolment in the Eastern region, where the proportion of the labour force employed in the government sector is about twice that for the province as a whole, is 'concentrated' in government-related programs; and enrolment in the Southwest region, relative to the province as a whole, is disproportionately weighted towards automotive technology, reflecting that region's involvement in the auto industry.

- The Central and Metro regions are the most comprehensive in their program offerings, offering programs in more than 90% of the occupational groupings used in the analysis. The northern regions are the least comprehensive, offering programs in about two-thirds of the occupational groupings. Given that northern colleges serve a much smaller population than Metro colleges and that the northern industrial base is not as diversified, the narrower range of programs offered in the northern regions does reflect a certain sensitivity to market conditions. It should also be pointed out that the range of programs in the northern colleges would be still narrower if it were not for the special funding provided to these colleges to allow them to offer programs with smaller section sizes than at other colleges in the system.

**Table 1**
**Program Enrolment Concentration by Economic Region, Fall 1988**

| 'High' Concentration Program Fields | Regional Enrolment in Program Field as a % System Enrolment in Program Field | # of Students in Program Field in Region |
|---|---|---|
| ***Northwest Region (2.7% of Total System Enrolment, 2,550 Students )*** | | |
| Automotive -Technology | 6.3% | 26 |
| Power -Technology | 17.9% | 21 |
| Welding - Technology | 15.6% | 14 |
| Aviation - Technology | 31.4% | 241 |
| Child/Youth Worker - Applied Arts | 5.7% | 72 |
| Health - Miscellaneous | 8.5% | 42 |
| ***Northeast Region (8.6% of Total System Enrolment, 8,095 Students )*** | | |
| Drafting - Technology | 24.6% | 46 |
| Instrumentation - Technology | 24.8% | 70 |
| Resources - Technology | 22.7% | 365 |
| Welding - Technology | 36.1% | 44 |
| Aviation - Technology | 25.3% | 194 |
| Preparatory/Upgrading - Applied Arts | 21.5% | 882 |
| ***Eastern Region (15.2% of Total System Enrolment, 14,244 Students)*** | | |
| Government/Real Estate - Business | 35.3% | 88 |
| ***Southwest Region (11.8% of Total System Enrolment, 11,117 Students)*** | | |
| Automotive - Technology | 40.7% | 167 |
| Government/Real Estate - Business | 26.5% | 66 |
| Art - Applied Arts | 25.8% | 125 |
| Horticulture - Applied Arts | 28.2% | 86 |
| Develop./Mental Ret. Wkr. - Applied Arts | 30.1% | 346 |

... continued

| 'High' Concentration Program Fields | Regional Enrolment in Program Field as a % System Enrolment in Program Field | # of Students in Program Field in Region |
|---|---|---|
| *Central Region (21.1% of Total System Enrolment, 19,804 Students)* | | |
| Resources - Technology | 65.8% | 1,060 |
| Materials Management - Business | 88.6% | 140 |
| *Metro Region (40.5% of Total System Enrolment, 38,030 Students)* | | |
| Recreation Facilities - Business | 100.0% | 147 |
| Small Business - Business | 85.0% | 238 |
| Fashion - Applied Arts | 88.4% | 953 |
| Crafts - Applied Arts | 83.8% | 218 |
| Public Relations - Applied Arts | 81.8% | 257 |

**Comprehensiveness of College Programming**

| | Economic Region | | | | | | |
|---|---|---|---|---|---|---|---|
| | NW | NE | East | SW | Central | Metro | System |
| Division | # of programs/Occupational groups | | | | | | |
| Technology | 9 | 12 | 10 | 11 | 14 | 14 | 14 |
| Business | 10 | 10 | 13 | 11 | 13 | 15 | 16 |
| Applied Arts | 9 | 11 | 15 | 14 | 14 | 17 | 17 |
| Health | 3 | 3 | 4 | 4 | 4 | 4 | 4 |
| **Total** | **31** | **36** | **42** | **40** | **45** | **50** | **51** |

**Issues/Implications**

- The variations among the regions in terms of both enrolment distribution by program area and in terms of the comprehensiveness of programming provide impressionistic evidence that students and colleges are fairly sensitive to the labour market conditions in their region.

- Although the analysis cannot make the case in and of itself for or against program rationalization, it indicates that one should not 'leap' to the decision that more formal program rationalization is required in the college system. Much more in-depth analysis should be undertaken before reaching any firm conclusions in favour of program rationalization.

**Related Background Documents Available at Council of Regents**

Howard Rundle, Enrolment Concentration in College Programs, 1989.

## International Education and Ontario's Colleges (Project #30)

### Findings

- Between 1976 and 1987 the number international students enrolled in full-time, college post-secondary programs in Ontario decreased by about 50%, falling from about 1,800 in 1976 to 900 in 1987.

- Beyond the collection of numbers of international students attending college, little information is systematically collected on the international activities of Ontario's colleges. In its brief to Vision 2000, the College Committee on International Education (CCIE) notes several types of international education activities in which the colleges, to a greater or lesser extent, are involved, including:
  - international students studying at Ontario colleges;
  - study-abroad programs for Ontario students;
  - work-abroad programs (i.e., co-op programs) for Ontario students;
  - student exchange programs;
  - staff exchanges;
  - consulting services provided by college staff to international clients; and
  - institutional twinning.

- The CCIE believes that the CAATs "are at an important crossroads: to carry on business as in the past or to adapt to the new realities;" that is adapt to "a change-prone, technology-driven, knowledge-based, globally-interdependent society." (pp.1-2)

- As part of the process of adapting to the 'new realities,' the CCIE recommends that:
  - international education be recognized as an integral part of the college mandate;
  - each college have an active International Education Department;
  - the colleges develop an effective marketing strategy with respect to their international education initiatives and services;
  - a system-wide international marketing secretariat be established to coordinate and support international activities of the colleges; and
  - each college 'internationalize' its curriculum.

- In addition, to the 'economic' arguments for expanding the international education activities of the colleges (that is, the need to provide Ontario residents with the skills and education necessary for adapting to and competing in the increasingly interdependent international economy), other potential benefits include:
  - a strengthening of Canada's contribution to developing countries;
  - the development of a better understanding of different cultures and global issues, among both Ontario and non-Ontario residents, which, given the expected increase in the international mobility of labour, will be ever more necessary if the full benefits of labour mobility are to be realized; and
  - a means for enriching the working lives of college teachers.

**Issues/Implications**

- The qualitative arguments for expanding the international education activities of the colleges would appear to be quite strong. In undertaking such an expansion, however, there will be a need to:
  - ensure that international students studying here and Ontario students studying or working abroad receive quality instruction and work placements. Within Ontario, this may mean that each college or groups of colleges should become specialists in particular fields of international education. For example, selected colleges might provide nursing education to international students; others might focus on business or technology training, and so on. If quality is not assured, there is the real danger that the flow of students to and from Ontario will not reach desirable levels.
  - coordinate and share curriculum development resources within the college system so that international curriculum may be effectively integrated into existing college programs for the benefit of Ontario residents who do not study abroad;
  - achieve a reasonable balance between the flow of students into and from Ontario, particularly with respect to formal exchange programs; otherwise, if, for example, the inflow exceeded the outflow, the Ontario public may feel that resources are being directed at foreign students at the expense of Ontario's students and, as a result, may discourage further forays into international education;
  - develop systematic data and information systems on the international education activities of colleges; and
  - in general, plan and coordinate the international activities of the colleges. The college system in *conjunction with* representatives of the provincial and federal governments might undertake to develop a strategic plan, and selected policies and procedures related to international education. (Both the federal and provincial governments are involved in sponsoring roles and, as well, represent valuable resources in terms of initiating and developing contacts abroad.)

**Related Background Documents Available at Council of Regents**

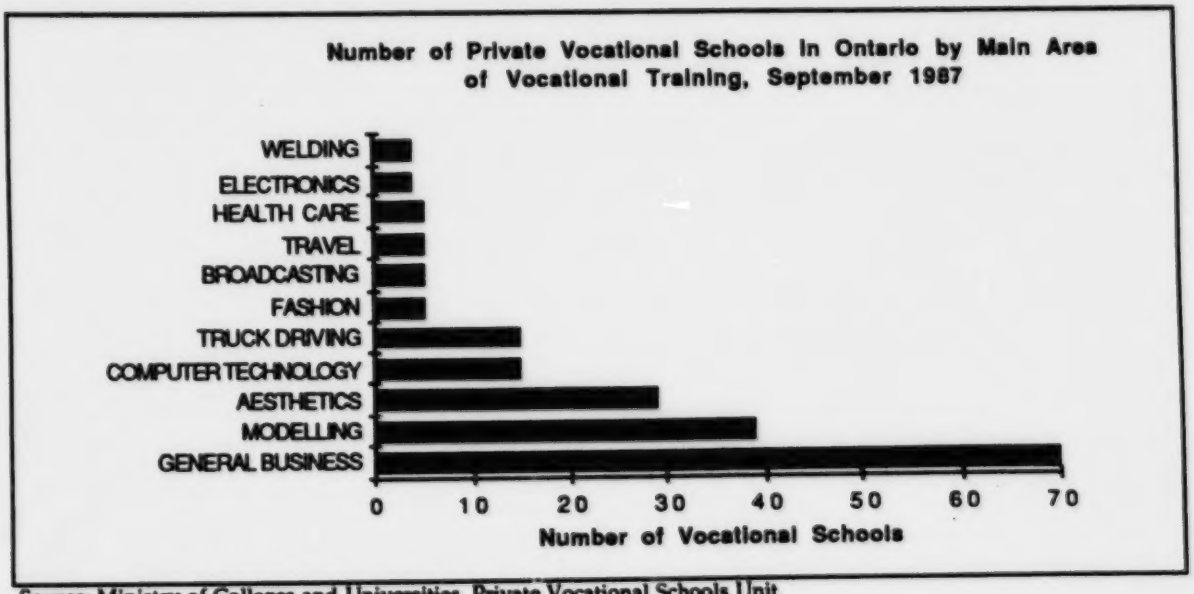
College Committee on International Education, International Education and the Ontario Colleges of Applied Arts & Technology, 1989.

International Activities Unit, Ministry of Colleges and Universities, Submission to Vision 2000, (Submission requested by Vision 2000; it represents the personal views of staff and is not meant to represent a ministry position or policy), 1989.

## Private Vocational Schools (Project #21)

### Findings

- Private vocational schools have a long history of operation in Ontario, dating back to the 1860s. Today there are more than 200 registered schools and it is a $75 million a year industry, training on average 30,000 students a year. Enrolment has been declining since the early 1980s. Historically private vocational schools enrolment trends have been counter-cyclical: when the economy shrinks, causing higher unemployment, enrolment swells; conversely enrolments taper as economic expansion occurs.




Source: Ministry of Colleges and Universities, Private Vocational Schools Unit

- The schools attract a wide spectrum of students (from those right out of high school to university graduates who want more specific training), but have been most successful in attracting 'mature students' who have labour force experience and may be attempting a career change or who require short-term, skill-specific training.

- Programmes average 6 months to 1 year in duration, but may last as long as 2 years. The average tuition fee is $3080.19, but can be as high as $5000-$10000. In 1987/88, tuition fees at the CAATs for a full-time student were $620.00 per year. The college student's tuition fees represent slightly less than 11% of the annual operating costs of training a post-secondary student; while tuition fees at private vocational schools represent 100% of annual operating costs, as the schools receive no outside funding.

- It is estimated that a day of training at a private vocational school is 40-50% cheaper than an equivalent day of training at a CAAT.

- The schools are subject to the Private Vocational Schools Act (1974) and programmes are accredited or regulated by a number of institutions including: the National Accreditation Commission (NAC); the Association of Canadian Career Colleges (ACCC); the Private Career Education Council (PCEC).

- The private vocational schools have a distinct advantage over their CAAT counterparts in terms of lower student/teacher ratios; frequent start-updates, and when providing training in 'comparable' programmes tend to do so in a shorter period of time. On the other hand, they are very risk adverse and cannot offer programmes that involve high capital costs or of longer duration.

**Issues/Implications**

- Changing population demographics may be advantageous to the private vocational schools, as the population aged 25-54 is projected to increase by almost 25%, and this age group makes up their natural market. On the other hand the population aged 17 to 24 is expected to decline by almost 10% between 1987 and 2000, and almost 85% of post-secondary enrolment falls within this age range.

- The redirection of federal training expenditures, through the Canadian Jobs Strategy (CJS), means that the CAATs will have to actively compete with other suppliers (including private vocational schools) of training

- There exists a concern that private vocational schools' training is too skill- and job-specific, especially in light of evidence that employers' needs may be shifting towards requiring a multi-skilled labour force. As well, new production techniques may result in training programmes with higher capital costs and of considerably longer duration. It is unlikely that the private vocational schools will become involved in training programmes that require large capital expenditures or that are of a longer nature.

- The CAATs may need to examine whether they should operate as if they are in a 'segmented' market and relinquish selected programmes to the private vocational schools.

**Related Background Documents Available at Council of Regents**

Robert Marshall, Mini-Project #21 - Private Vocational Schools - The Fourth Option?, 1989.

## Trends in Federal Training Policy (Project #5A)

**Findings**

- Federal expenditures on *active* labour market programs (e.g., mobility assistance, training and retraining, placement services, and job creation) have fallen *relative* to expenditures on *passive* programs (e.g., income maintenance programs). For example, from the mid-sixties to the end of that decade, the ratio of federal unemployment insurance expenditures to federal training expenditures was about 1.37 : 1; by 1987 this ratio was almost 7:1. In 1987 Canada ranked sixth among the 22 OECD countries in expenditures on unemployment compensation; Canada spent 1.68% of its GDP on unemployment compensation, while, for example, Germany spent 1.33%, Japan 0.42%, and the United States 0.59%.

- The introduction of the Canadian Jobs Strategy (CJS) in 1985 represented a fundamental change in federal government policy. CJS places much greater emphasis on the involvement of the private sector in the development and delivery of training programs than previous federal initiatives.

**Percentage of Federal Training Dollars to Colleges and Other Suppliers of Training**

| | | | Estimates | |
|---|---|---|---|---|
| | 85/86 | 86/87 | 87/88 | 88/89 |
| CAATs | 98.4 | 95.9 | 94.3 | 91.9 |
| Other Suppliers | 1.6 | 4.1 | 5.7 | 8.1 |

Source: Ontario Ministry of Skills Development

**Percentage of Colleges' Federal Training Dollars Via 'Indirect' and 'Direct' Purchase Routes**

| | | | Estimates | |
|---|---|---|---|---|
| | 85/86 | 86/87 | 87/88 | 88/89 |
| Indirect | 0 | 8.3 | 19.3 | 27.4 |
| Direct | 100 | 91.7 | 80.7 | 72.6 |

Source: Ontario Ministry of Skills Development

- Total federal training expenditures in Ontario fell 13.5% (in real terms) between the introduction of CJS in 1985-86 and the 1988-89 fiscal year.

- Under the CJS, federal training dollars may find their way to the colleges by two routes, namely: (i) through 'direct' purchases by the federal government; and (ii) through 'indirect' training purchases by Community Industrial Training Committees and other community agencies.

- Federal training expenditures (direct and indirect) *flowing to Ontario's colleges* have been falling at an even greater rate than total federal training expenditures since the introduction of CJS. Between 1985-86 and 1988-89, federal expenditures flowing to the colleges are estimated to have fallen 19.1% in real terms.

- Increasingly the federal dollars finding their way to the colleges are arriving by the indirect route. In 1985-86 essentially none of the federal dollars flowing to the colleges came via the indirect route; by 1988-89 more than 25% of federal funds were arriving by this route. Thus, the colleges are becoming increasingly dependent upon the *competitive* (indirect) route as a source of federal training dollars.

- In the recently published de Grandpre Report (1989), **Adjusting to Win**, it is argued that it is not possible to distinguish between unemployment that is a result of the Canada-U.S. free trade and unemployment caused by other factors. The report goes on to suggest that on 'equity' grounds all persons who find themselves unemployed should have access to training and retraining. To finance this rather 'comprehensive' policy, the introduction of a levy-grant scheme is advocated " as an incentive to stimulate private sector training." Under such a scheme a tax liability would be established which employers would be able to offset by making expenditures on training.

- The recent pronouncements in the Speech from the Throne (XXX Parliament) suggest, however, that, at least in the short run, a levy-grant system will not be part of the federal government's program. The government has indicated that it intends to shift expenditures from passive labour market measures

(UI) to more active measures. In 1990 $800 million of UI expenditures will be reallocated to training and skills upgrading programs. The government, in keeping with the policy direction initiated by CJS, continues to stress the need for a 'substantial' increase in the private sector's involvement in training.

**Issues/Implications**

- For the immediate future at least, the college system will find itself competing with private suppliers of training for federal funding. To flourish in this more competitive environment the college system must determine the program and geographical areas in which it is likely to have a comparative advantage. Colleges are likely to have an advantage in program areas which by necessity are longer in duration or more capital intensive in terms of inputs.

- The 'jury' is still out on what areas of training the private sector can be more *cost-effective* than public institutions. As experience increases, we will likely witness shifts in the allocation of federal funding — training which was initially thought to be better suited for the private sector will move to the colleges and vice versa. Thus the colleges will need to be not only competitive but also able to withstand and respond to changing federal views on where different types of training should take place. Increasingly training 'partnerships' between the private sector and public institutions may develop, with each sector contributing to a particular training program what it can do best.

- The federal government's reallocation of UI funds does signal a movement towards a more active labour market policy. The colleges, even given stiff competition from the private sector, may be able to increase their revenues and training activity somewhat if this change in government direction persists.

**Related Background Documents Available at Council of Regents**

Craig McFadyen, Mini-Project #5, Trends in Federal Training Policy, 1989.

## Employer Sponsored Training (Project #22)

**Findings**

- The incidence of employer sponsored training (EST) appears to be positively correlated to firm size. A survey conducted in 1984 by the Ontario Manpower Commission found that approximately 27% of all Ontario employers sponsored formal training programs and that "the incidence increases with the size of the establishment, from a low of 24% for the smallest establishments (those with fewer than 20 employees) to a high of 88% for the largest (those with 200 or more employees)."

- There are indications that EST has been on the increase in recent years. The OMC, for example, reported that the percentage of medium-sized firms engaged in formal training increased from 52% in 1984 to 61% in 1987. This growth in EST, however, has been attributed to increases in economic growth during this period and not to increased development of a 'training culture' within firms.

- EST tends to focus on certain occupations within firms (management followed by sales staff, production workers, skilled labour, and clerical staff); it usually is of short duration (65% of employer sponsored training is of 2 weeks duration or less); and it tends to be geared to the workplace orientation needs of new hires.

- In comparison with other advanced industrialized countries, expenditures by Canadian employers on training is well below the average; Canada relies on publicly funded institutional training to a much greater extent than other countries.

- Two factors commonly cited as inhibitors to EST are: (i) fear of 'poaching' by competitors — it may be less expensive to hire individuals trained by another firm than to provide training; and (ii) insufficient size of a firm — for smaller firms the per unit costs of providing training may exceed the benefits.

- While a significant proportion of EST is done 'in-house,' approximately 30% is contracted out to public or private sector trainers. EST is accounting for a growing share of college revenues and, although this share remains low system-wide (less than 3% of total revenue), some colleges have experienced considerable success in attracting revenues (up to 9% of total revenue) from this source.

- Employers indicate that there is much room for increased college participation in the delivery of employer sponsored training; however, they also stress that if this is to occur, colleges will need to: (i) become more knowledgeable about the needs of employers; (ii) place more emphasis on standards; (iii) be more flexible in terms of curriculum design and location of training; and (iv) better inform firms, particularly small and medium sized firms, of their training capabilities.

**Issues/Implications**

- The changing demographics and increasing difficulties in attracting skilled immigrant labour will place greater pressures on employers to find ways for upgrading and updating employees. The colleges can play an important role in this area. However, to the extent that pubic funds are (might be) used to assist employers in their training efforts, care must be taken to ensure not only that the specific interests of employers are being addressed but, also, that societal needs are being met.

- From the public perspective, one factor which needs to be taken into account is the portability of skills acquired through training, in terms of both transferability from one industry/occupation to another and transferability over time (that is, are the skills ones which will serve workers well over an extended period of time or are they likely to be of value for a relatively short period of time). Another factor which may be important from the public's perspective is the fact that smaller firms tend to be less inclined or able to engage in training than larger firms. To serve the public interest colleges may need to resist focussing too much of their attention on obtaining contracts with larger firms; while providing training services to larger firms may be the easier and more prestigious route for colleges to follow, it should not be followed at the neglect of the needs of smaller firms.

- It may be worthwhile to assess the feasibility of having colleges offer their training services to employers at a variety of prices, ranging from 'full cost' prices to 'subsidized' prices. The price quoted to a particular employer could depend, in part, on the nature of the skills training (general and portable versus specific and limited portability) desired by the employer and the ability of the employer to pay (as determined somewhat arbitrarily by factors such as the size of a firm).

- Employers increasingly seem to desire training which enhances their employees' basic analytic and communication skills and which also provides employees with quite firm specific job skills. Colleges will need to develop curriculum which 'strike(s) a balance between between the specific and the general' if they are too increase their participation in EST.

- College faculty who have been mainly involved in teaching 'young' high school graduates may need to adjust their teaching styles to reflect the different needs and backgrounds of the 'older' employer-sponsored students. College faculty, to an even greater extent than before, will need to keep abreast of technological and organizational changes in the workplace if the training is to be considered relevant by employer-sponsored students. Colleges will need to find ways of increasing their flexibility in terms of when and where EST can be offered.

- By improving the development and marketing of programs to industry for the purposes of attracting greater EST revenues, the colleges may also improve their competitive position vis a vis the growing pool of 'indirect' (i.e., CITC administered) federal training purchases.

**Related Background Documents Available at Council of Regents**

Craig McFadyen, Jim Hsu and Herb Young, Employer Sponsored Training, 1989.

## Determinants of Post-Secondary Education Choice: The Choice Between Community Colleges and Universities (Project #3)

### Findings

- What determines the type of post-secondary institution (college versus university) a student selects? This is essentially the question posed by Noemi Stokes and David Foot in work undertaken by them for Vision 2000.

- Answering this question is important not only from the perspective of accessibility (the socioeconomic distinctions between college and university students may be as significant as the distinctions between those who attend post-secondary institutions and those who do not) but, also, from the perspective of an 'efficient' distribution of students between colleges and universities (students' decisions regarding the type of post-secondary institution to attend may not conform to societal needs).

- Stokes and Foot include in their analysis of educational choice variables relating to:

  - *Family Background* (e.g., parental education, ethnicity, and parental income);
  - *Student Characteristics* (e.g., gender, age, and marital status);
  - *Institutional Characteristics* (e.g., reputation, location, and programs of institutions); and
  - *Financial Factors* (e.g., tuition fees and other costs of attendance, and student loans).

- If the government wanted to influence student choice, the financial variables represent one set of policy instruments which it might utilize. Thus, understanding how students respond to these instruments is important and the work of Stokes and Foot sheds some light on this.

- Their findings are based on an analysis of data from a nation-wide survey of post-secondary students undertaken by Statistics Canada in spring 1984; from this sample they analyzed data relating to first year, full-time students. The results reported here are for Ontario (n=857) only; national (n=5775) and other regional results may be found in their papers.

**Impact of Family Background and Student Characteristics on Student Choice**

| | Probability of Attending College | Probability of Attending University[1] | Ratio of Probabilities |
|---|---|---|---|
| **Family Background** | | | |
| **Mother's Education:** | | | |
| Elementary | .379 | .621 | 0.61 |
| Secondary | .401 | .599 | 0.67 |
| Some Post-Sec. | .389 | .611 | 0.64 |

1. These probabilities were derived from an analysis which simultaneously takes into consideration all factors determining student choice. These probabilities are not the simple averages derived from the sample.

... continued

| | Probability of Attending College | Probability of Attending University[1] | Ratio of Probabilities |
|---|---|---|---|
| University[2] | .275 | .725 | 0.38 |
| **Father's Education:** | | | |
| Elementary | .492 | .508 | 0.97 |
| Secondary | .443 | .557 | 0.80 |
| Some Post-Sec. | .401 | .599 | 0.67 |
| University | .196 | .804 | 0.24 |
| **Ethnicity[3]:** | | | |
| English | .409 | .591 | 0.69 |
| French | .399 | .601 | 0.66 |
| Irish | .344 | .656 | 0.52 |
| Scottish | .356 | .644 | 0.55 |
| German | .342 | .658 | 0.52 |
| Italian | .408 | .592 | 0.69 |
| Ukrainian[4] | .133 | .867 | 0.15 |
| Other Minority | .367 | .633 | 0.58 |
| **Student Characteristics** | | | |
| **Family Status:** | | | |
| Single | .334 | .666 | 0.50 |
| Sep./Div./Wid.[4] | .725 | .275 | 2.64 |
| Married | .369 | .631 | 0.58 |
| **Gender:** | | | |
| Male | .384 | .616 | 0.62 |
| Female | .366 | .634 | 0.58 |
| **Age:** | | | |
| Age=20 | .422 | .578 | 0.73 |
| Age=30 | .168 | .832 | 0.20 |
| **Last Previous Activity** | | | |
| Student Last Yr. | .322 | .678 | 0.47 |
| Actual | .375 | .625 | 0.60 |

- Parents' education was found to be a very important determinant of institutional choice. Controlling for all other factors, post-secondary students with fathers with an elementary school education are 2.5 (.492/.196) times more likely to choose college over university than students with fathers who have

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1. These probabilities were derived from an analysis which simultaneously takes into consideration all factors determining student choice. These probabilities are <u>not</u> the simple averages derived from the sample.

2. One way to interpret these probabilities is as follows. If, for example, one selected 1,000 first year post-secondary students who had mothers with a university degree <u>and</u> these students were distributed in the same manner as the post-secondary population as a whole with respect to other variables (e.g., ethnicity, age, family income, father's education, sex...), then about 275 would be enroled in college and 725 in university, while in the post-secondary population as a whole 375 of every 1,000 students select college and 625 select university.

3. Students may report more than one ethnicity, so these probabilities should be treated with some care.

4. Based on very small sample size.

graduated from university. Similarly, post-secondary students with mothers with an elementary education are 1.4 (.379/.275) times more likely to choose college over university than students with university-educated mothers. These results are consistent with the hypothesis that children become better acquainted with the benefits of an institution attended by their parents and are positively influenced by this knowledge.

- Ontario post-secondary students from English, French, and Italian backgrounds are more likely to select college over university than students from other ethnic backgrounds. For example, controlling for all other factors, students from English backgrounds are 1.2 (.409/.344) times more likely to choose college over university than students with Irish backgrounds. Differences among ethnic groups in terms of the degree of need for achievement and in terms of what satisfies the need for achievement may affect the choice between college and university.

- The likelihood of selecting college over university decreases as parental income increases. Between the 25th percentile and 75th percentile of parental income the probability of selecting college over university decreases by about 15 percent, from 0.42 to 0.36.

- Younger students are more likely to choose college over university than older students. All other things being equal, students aged 20 are 2.5 (.422/.168) times more likely to choose college over university than students aged 30. This result may reflect not only the fact that college entrants have generally had one year less of high school than university entrants but, also, that "older, more mature students find their inner needs better satisfied by a somewhat more sophisticated university education." (p.17 Regional Paper)

- In addition, all other things being equal: (i) individuals who were working or had family responsibilities are more likely to choose college over university than individuals who were in school in the previous year; (ii) first year post-secondary students who are married are 1.1 (.369/.334) times more likely to choose college over university than single students, with married females being more than 1.5 times as likely as single females; and (iii) first year post-secondary males are about 1.05 (.384/.366) times more likely to choose college over university than their female counterparts.

- Students who indicated that the type of program offered by an institution was important were about 15 percent more likely to choose college over university than students who did not indicate that the type of program was important.

- Students who indicated that the reputation of the institution was important were about 30 percent less likely to choose college over university than students who did not indicate that reputation was important.

**Issues/Implications**

- Government has little if any influence over many of the variables affecting student choice. For example, ethnicity and parental education cannot be significantly affected by government policy, particularly in the short run.

- Tuition, however, is a variable over which government has some control. But the results of the Foot/Stokes analysis of student choice suggest that while tuition in a statistical sense is a significant variable, it does not appear to be a lever which could be used to bring about major changes to the distribution of students between college and university. Their results indicate that a 7% increase in university fees, holding college fees constant, would lower the percentage of students selecting university over college by only 1% (or 0.6 percentage points), from 62.5% to 61.9%.

- The results also suggest that as we approach the 21st century the changing demographic conditions will be more favourable for university than college enrolment. In a world where the population is aging,

parental education and income are rising, and there are more single people, universities are likely to attract an increasing percentage of those embarking upon a post-secondary education. This, however, does not necessarily imply that college enrolment will decline, only that the college system's share of post-secondary enrolment may decline.

**Related Background Documents Available at Council of Regents**

Noemi Stokes and David Foot, Regional Differences in the Determinants of Post-Secondary Educational Choice in Canada: Community College versus University, 1989.

David Foot and Noemi Stokes, University or College? Determinants of Post-Secondary Institutional Choice in Canada, 1989.

## Overlap of University and College Part-Time Activities (Project #24)

**Findings**

- Registrations in part-time courses in the college system are almost double the number in the university sector. About two-thirds of the part-time registrations in university courses are in degree credit courses; universities receive provincial funding for these courses. The other third of registrations are in non-degree credit courses (vocationally-oriented and general interest) and provincial funding is not provided for these courses. About two-thirds of part-time registrations in college courses are in 'vocationally-oriented' courses in which the colleges control the entrance and exit standards; these courses are provincially funded and may or may not be credit courses for college post-secondary diplomas and certificates. The other third of college part-time registrations are in general interest courses and vocationally-oriented courses controlled by organizations external to the college system; provincial funding is not provided for these courses.

**Part-Time Registrations in College and University Courses**

| | College | | | University | | |
|---|---|---|---|---|---|---|
| | Funded | Non-Funded | Total | Funded | Non-Funded | Total |
| 1985 | 452,838 | 227,864 | 680,702 | 256,285 | 125,517 | 381,802 |
| 1986 | 490,265 | 251,201 | 741,466 | 260,477 | 124,803 | 385,280 |
| 1987 | 492,422 | 265,599 | 758,021 | 263,909 | 134,234 | 398,143 |

- The different criteria for funding university and college courses (degree-credit versus vocationally-oriented) can lead to the situation in which comparable courses are provincially supported in the college system but not in the university system. This situation is most likely to arise in part-time certificate programs in which an external organization has some involvement but the college or university maintains control over the entrance and exit standards; in such circumstances provincial support is provided for the college courses but not for the comparable university courses.

- Tuition fees for funded (i.e., degree credit) university courses tend to be two to three times the college fee for funded courses, which is $1.50 per instructional hour. Similarly, fees for non-funded university courses tend to be higher than those charged for non-funded college courses; instructors teaching non-credit courses in the universities appear to receive roughly twice the hourly rate paid to college continuing education instructors.

- In terms of assessing overlap between college and university part-time activities, the fact that about two-thirds of the university activity is in the degree-credit area presently limits the potential for a

large amount of overlap. Some overlap exists in non-degree credit vocationally oriented courses and general interest courses. The overlap occurs predominantly in the mounting of seminars, course offerings in the business and management development areas, in professional association programmes, and in selected general interest and personal enrichment areas. However, on the basis of three 'case studies' (Seneca College and York University; St. Clair College and the University of Windsor; and Northern and Sault Colleges and Laurentian University), the overlap which does exist does not appear to be causing concern in either the university or college sector. The population base being shared by the two sectors is sufficiently large that where similar courses are offered simultaneously in both sectors, the financial viability of the courses is not being adversely affected and accessibility is being enhanced.

**Issues/Implications**

- Based on the case studies presented, little adverse duplication or overlap appears to be occurring between neighbouring colleges and universities. The situation should, however, be monitored on a regular basis to ensure that 'inefficiencies' do not develop.

- Given that universities, colleges, and school boards all may offer similar part-time courses, it might assist part-time students if a common calendar were developed which included the part-time courses offered by all three sectors; along the same lines, it might be beneficial to establish 'storefront' information centers at which a prospective student could obtain information on the part-time offerings of each sector.

- The government may wish to examine whether the different criteria it uses for funding university and college courses are appropriate. Should students enrolled in essentially the same course pay a higher fee at a university than at a college because funding is not provided for non-credit but vocational university courses ?

**Related Background Documents Available at Council of Regents**

Teresa Karolewski, Overlap of University and College Part-time Activities, 1989. Also see Project # 4, Teresa Karolewski, Continuing Education Students at Ontario's Community Colleges: Profiles and Trends, 1989.

## College-University Program Arrangements (Project #25)

**Background and Findings**

- The purpose of the research was to examine the linkages colleges have with universities. In this study the college-university arrangements of greatest interest were those which involved the movement of college students into universities.

- All 22 colleges were sent a questionnaire (19 responded) composed of three forms: Form A was designed to provide an inventory of college-university student arrangements which involved either the transfer of college students to university programs or the joint offering by a college and a university of a program; Form B was designed to collect specific detail on those arrangements identified in Form A; and Form C was designed to collect information on other types of arrangements colleges may have with universities (e.g., the sharing of space or equipment).

- The accompanying table shows the number of program specific arrangements by college and type. Arrangements with Lakehead University are excluded because it has a province-wide general policy for the transfer of CAAT students. In total, 27 arrangements were in operation in 1988, of which 23 were transfer (college to university) arrangements and 4 involved the joint provision of a program by a college and university.

- Of these 27 arrangements, 17 have been implemented since 1979, with 11 being implemented in 1988-89. In addition to the arrangements in operation in 1988, a number are about to be implemented or negotiated; colleges involved include: Durham, Centennial, Conestoga, Georgian, and Niagara.

**Number of Arrangements by College and Type, 1988-89**

| College | Transfer Arrangements (1) | Joint - D (2) | Joint -ND (3) | Total |
|---|---|---|---|---|
| Algonquin | 1 | 0 | 0 | 1 |
| Cambrian | 0 | 0 | 0 | 0 |
| Canadore | 0 | 0 | 0 | 0 |
| Centennial | 1 | 0 | 0 | 1 |
| Conestoga | 0 | 0 | 0 | 0 |
| Confederation* | | | | |
| Durham* | | | | |
| Fanshawe | 3 | 0 | 0 | 3 |
| George Brown* | | | | |
| Georgian | 2 | 0 | 0 | 2 |
| Humber | 0 | 0 | 0 | 0 |
| Lambton | 3 | 0 | 0 | 3 |
| Loyalist | 0 | 0 | 0 | 0 |
| Mohawk | 2 | 1 | 0 | 3 |
| Niagara | 2 | 0 | 0 | 2 |
| Northern | 0 | 0 | 0 | 0 |
| Sault | 5 | 1 | 0 | 6 |
| Seneca | 0 | 1 | 0 | 1 |
| Sheridan | 1 | 1 | 0 | 2 |
| S.S.Fleming | 0 | 0 | 0 | 0 |
| St. Clair | 2 | 0 | 0 | 2 |
| St. Lawrence | 1 | 0 | 0 | 1 |
| Total | 23 | 4 | 0 | 27 |

* did not respond

Notes:

(1) 'Transfer' arrangements allow for the transfer of some credits for students or graduates moving from the college program to a university program.

(2) 'Joint-D' arrangements involve the joint provision of the program by the college and university and graduates of the program are eligible to receive a university degree (graduates may also receive some form of college certification).

(3) 'Joint-ND' arrangements involve the joint provision of the program by the college and university but graduates of the program are not eligible to receive a university degree (e.g., the university provides selected courses in a college program for which only a college diploma or certificate is awarded upon successful completion of the program).

- None of the 27 arrangements reported is province-wide in application; each program-specific arrangement is between one college and one university. The only discipline area in which a university has agreements with more than one college is early childhood education; the University of Windsor has two agreements, one with Fanshawe and one with St. Clair, and Brock has three agreements, two with Lambton and one with Niagara. (It should be noted that in addition to these 27 arrangements,

Lakehead and Laurentian have province-wide policies on credit for college courses in specific program areas.)

- Thirty percent of the arrangements are with American universities and another thirty percent are with the University of Windsor.

- Most of the program arrangements have been in the 'liberal arts' area and/or in areas that feed the service sector. Business, early childhood education, and general arts and science programs are the program areas in which arrangements are most frequent.

- Under the program specific arrangements, a student completing a 3 year college program generally receives, at maximum, credit equivalent to completion of 50 to 75% of a 4 year university program; a student completing a 2 year college program generally receives 2 years of university credit if entering a 4 year university program and 1 year of credit if entering a 3 year university program. American universities tend to provide more credit than do Ontario's universities.

- In addition to information collected on arrangements through the survey, university calenders revealed that where specific college-university transfer arrangements have not been negotiated, the maximum credit given to college students enrolling in university programs is 5 (the equivalent of one year of university), provided they meet specific requirements.

- In 1986-87, 3.4% (1,362) of new university registrants had attended college at some time (about one half of them had a college diploma). In the past decade this percentage has increased by 40 to 50%. In 1986-87, 6.6% (about 3,150) of new college entrants (post-secondary) consisted of students who attended university at some time (about one-quarter of them had a university degree). This percentage has increased moderately over the period 1983-84 to 1986-87, with it being 5.8% in 1983-84.

- One of the major reasons for developing arrangements with a university is that arrangements made college programs more attractive to potential students and were seen as a means of increasing enrolment in particular programs; another reason frequently cited was that the arrangements between the colleges and the universities were seen as a means for enabling each institution to contribute what it does best to the education and training of students

- On the whole neither transfer nor joint arrangements have led to, or required, significant changes in the nature of college programs. Some respondents noted an increased emphasis being placed on 'thinking' and 'communication' skills.

**Issues/Implications**

- The results of this survey are encouraging in some respects. Colleges and universities are increasingly embarking upon the development of program-specific arrangements; program-specific arrangements appear to make it possible for college students to receive more credit upon transfer than that stipulated in general university transfer policies; and such arrangements do not seem to require significant changes to college programs.

- The findings, however, point to some potentially serious weaknesses of the current 'bilateral or *laissez-faire* model' for developing college-university program arrangements. It, at least to date, appears to yield rather limited and quite uneven opportunities for college graduates wanting to enrol in university programs in Ontario; arrangements exist for only a limited number of programs; there are very few arrangements in the more technical fields (e.g., technology programs); arrangements for a particular program exist at one or two colleges but not at other colleges offering the program; and arrangements for a given program exist at only one or two universities.

- While the survey respondents were generally in agreement that colleges should attempt to increase the number of arrangements with the university sector, they felt such arrangements should not adversely affect the colleges' ability to serve those seeking the vocational-oriented training traditionally provided by colleges.

- The increasingly rapid pace of technological change suggests the need for arrangements in the area of 'advanced technical' studies (e.g., electrical engineering technology).

- There may be some obstacles which need to be overcome if college-university credit arrangements are to be more widespread; for example, universities may be reluctant to grant credit for academic work for which they have no control over, or universities may wish to have some say over college curriculum but colleges might view this as an unwelcome intrusion into their affairs.

- Should the development of future arrangements rely solely on the 'bilateral model' currently in place, whereby individual colleges and universities on their own initiative undertake to develop arrangements? Or, should, for example, a provincial body be created to facilitate the development of college-university arrangements?

**Related Background Documents Available at Council of Regents**

Robert Marshall, College-University Transfer Arangements Existing in Ontario — Questionnaire Results, 1989.

## Awareness and Perceptions of Colleges (Project #27)

**Findings**

- The findings presented here are based on a survey of 700 general and advanced high school students from across Metro Toronto (including Barrie), conducted in Spring, 1989. The survey was commissioned by Metro's CAATs.

**Factors Affecting Choice of Post-Secondary Institution**

- Among 31 attributes listed in the questionnaire the most important in selection of a post-secondary institution were:
    - career/job opportunities open to graduates;
    - the success of its graduates;
    - earning potential of graduates; and
    - the reputation of programs in my area of interest;

  Followed by:
    - ease of gaining admission;
    - availability of co-op programs;
    - recommendations of employers;
    - reputation of the faculty; and
    - the institution's facilities/equipment

  The least important were:
    - the opinions of friends and relatives;

- being able to move away from home to attend;
- on campus student residences;
- the opinion of current students; and
- the physical appearance of the campus. (pp.57-58)

**Impressions of College and University**

- Ratings of impressions by high school students of college and university revealed high agreement with the following statements:
  - colleges provide practical training;
  - colleges cost much less to attend than universities;
  - it is much easier to get into college than university;
  - university courses are a lot tougher than college courses;
  - universities give you a more in-depth education than college; and
  - a university degree would be more valuable to me than a college diploma.

- These were followed by relatively high levels of agreement (agree somewhat) with the following:
  - Ontario colleges are highly respected educational institutions;
  - there are thousands of high profile college grads;
  - colleges are becoming increasingly popular;
  - for the career I'm interested in, a university degree is required;
  - in our high school, universities are promoted more strongly than colleges;
  - I would be proud to tell my friends I am attending a community college; and
  - colleges excellent education in many areas not offered at university.

- There was disagreement with the following statements:
  - colleges have a dull student life in comparison with universities;
  - college grads are more likely to find jobs than university grads;
  - colleges have no residences for out-of-town students;
  - college grads advance quickly into leadership positions;
  - colleges are the fast track to the good life;
  - the starting salary for a community college graduate is equal to or higher than a university graduate; and
  - colleges give you more value for your money." (pp.64-65)

- "Colleges are perceived to provide easier, more practical education than universities (it's not the Olympics of the mind), are reasonably well respected institutions that are becoming increasingly popular, but their graduates are not perceived to advance quickly, have superior earning power or enjoy the good life, which undermines the value perception despite the widespread impression that colleges cost less to attend than university. In other words, one of the colleges' greatest weaknesses is the perceived lack of success of its graduates — the most important attribute in selecting post-secondary education." (pp.v-vi)

- "While perceived likelihood of attending university lags behind appeal of attending university, the opposite is true for colleges...The greater appeal of university over college is consistent with national

data among high school students that indicate 50% want to graduate from university while only 24% want to complete college or technical training." (pp. ii-iii)

**Issues/Implications**

- Colleges are not viewed in as positive terms as universities by high school students; as a result, there is the danger that, from a societal perspective, a disproportionate number of students are choosing (and will choose) university over college.

- Colleges and the post-secondary sector as a whole should strive to provide college students (graduates) with educational opportunities which will reduce the likelihood of 'career-dead-ending'. Such opportunities might be increased through: (a) greater emphasis on generic skills (e.g., skills - analytical, communication ... which are more easily transfered from one job or occupation to another); and (b) the development of more and better linkages between colleges and universities to provide college graduates greater access to university programs.

**Related Background Documents Available at Council of Regents**

Burwell Hay, Metro Colleges - Image and Appeal, (a report prepared for Continental Golin/Harris and their client, Metro's colleges), 1989.

In addition, from individual colleges one may be able to obtain results from the following surveys.

| College Conducting Survey | Year | Target Groups |
|---|---|---|
| Niagara | 1986 | Sec. School Students; General Public. |
| Sheridan | 1986 & 1988 | Sec. School Students; General Public; Teachers & Counsellors. |
| St. Lawrence-Brockville | 1986 | Sec. School Students; General Public |
| St. Lawrence-Kingston | 1987 | College Students; Adults. |
| St. Lawrence-Cornwall | 1989 | Ont.&Que. Sec. Students; General Public. |

## College Operating Revenue and Funding Per Student (Project #14)

### Findings

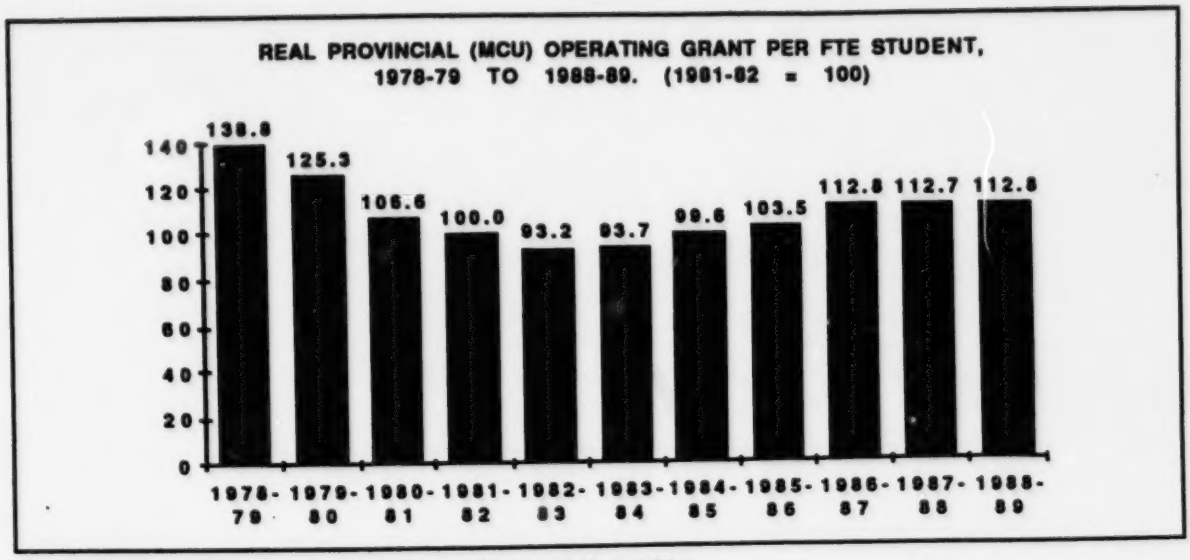
**Sources of College Operating Revenue, 1979-80 and 1986-87**

| | 1979-80 | 1986-87 | % change in share |
|---|---|---|---|
| | % | % | |
| Grants - MCU | 60.6 | 56.7 | -6.4 |
| Grants - MSD | 0.9 | 6.5 | 614.2 |
| Grants - CEIC | 18.6 | 13.8 | -26.2 |
| Tuition | 10.1 | 9.8 | -3.6 |
| College - Educ[1] | 1.3 | 3.8 | 187.1 |
| College - Other[2] | 7.0 | 7.7 | 9.7 |
| Miscellaneous. | 1.4 | 1.8 | 25.9 |
| | 100[3] | 100[3] | |

1. This revenue source consists of revenues colleges have obtained through contracts for educational services and special projects.
2. This revenue source consists of investment income, revenues from the sale of course products, computer revenue, premise rent revenue, and ancillary income.
3. 'Flowthrough' funds such as OCAP and Futures student stipends are not included in this breakdown of revenue sources.

Source: Ontario College Information System

- As the chart above shows, the Ministry of Skills Development and college contract education have emerged as fairly significant sources of revenue for the college system. The Ministry of Colleges and Universities continues to be the major source of revenue, although as a percentage of total college revenues MCU's contribution has fallen somewhat. The CEIC (federal government) contribution, relative to other sources, has decreased significantly; this decline coincides with the introduction of the federal government's Canadian Jobs Strategy program in 1985-86.




Source: College Affairs Branch, Ministry of Colleges and Universities.

- This chart shows in index form the real (constant $) grant per full-time equivalent student provided to the colleges by the Ministry of Colleges and Universities. This funding is directed mainly towards full-time post-secondary activities, but also supports tuition short activity and part-time vocational activity.

- If nothing else, one can conclude from this chart that the colleges have experienced 'turbulent times' in terms of the real per student funding provided to them for these activities. On the one hand, between 1978-79 and 1982-83, the real grant per FTE declined 33%; on the other hand, between 1982-83 and 1988-89, it increased 21%.

- If the colleges in 1988-89 had been funded at the 1978-79 per student level (the peak level over the period '78-79 to '88-89), the system's MCU operating grant would have been $152 M more or 23% more than that actually provided; if, however, the system had been funded at the 1982-83 level (the lowest level over the period), its 1988-89 operating grant would have been $115 M less or 17% less than that actually provided in 1988-89. This range of funding is roughly equivalent to having the system one year train 'x students' with 'y teachers,' and in a subsequent year train the same number of students with 30% fewer teachers.

**Issues/Implications**

- The system's ability to fulfil a mandate is affected not only by the level of funding but, also, by the stability of the funding. When one combines the variation in MCU funding with the changing priorities of MSD and CEIC as reflected in the table above, it is not surprising that people within the colleges and others on the periphery of the system are asking what the college system's mandate ought to be.

- With respect to the level of funding several questions arise. Is, for example, the funding currently being provided to the colleges by MCU sufficient to simultaneously: (i) maintain accessibility; (ii) provide remedial courses to post-secondary students experiencing difficulties with writing, reading, and basic mathematics; and (iii) provide students with not only specific occupational skills training but, also, a reasonable general (e.g., liberal arts) education which would assist students in understanding other cultures and the social/economic issues of the day? What indicators are needed to answer this question? And if the answer to this question is in the negative, what should be done? Should the public investment in the college system be increased? Should accessibility be decreased? Or, should the

colleges continue to strive to maintain or increase student numbers within the current funding parameters, recognizing that this limits the training and education provided to the students?

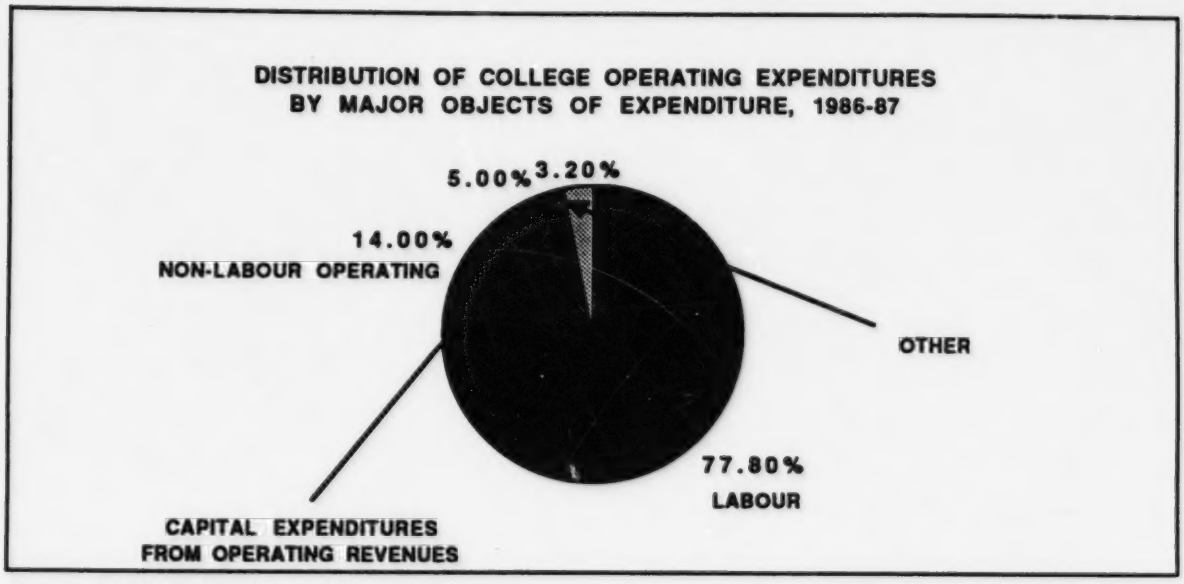
- And, are there ways of bringing greater stability to the funding provided per student which do not necessitate wide swings in accessibility levels?

**Related Background Documents Available at Council of Regents**

Howard Rundle, Mini -Project #14 - College Revenue and Funding Per Student, 1989.

## College Expenditure Patterns, 1978-79 to 1986-87 (Project #29)

**Findings**




Source: Ontario College Information System

- As the chart above shows, the college system is very labour intensive, with almost 78% of discretionary operating expenditures (all operating expenditures *except* termination gratuities, municipal taxes, approved premise rentals, and student stipends which are supported by specific grants) attributable to staff salary and benefits, contracted labour services, and professional development.

- Labour's share of operating expenditures has increased somewhat since the late 1970s. In 1978-79 labour's share was 76.4% or about 2% lower than in 1986-87.

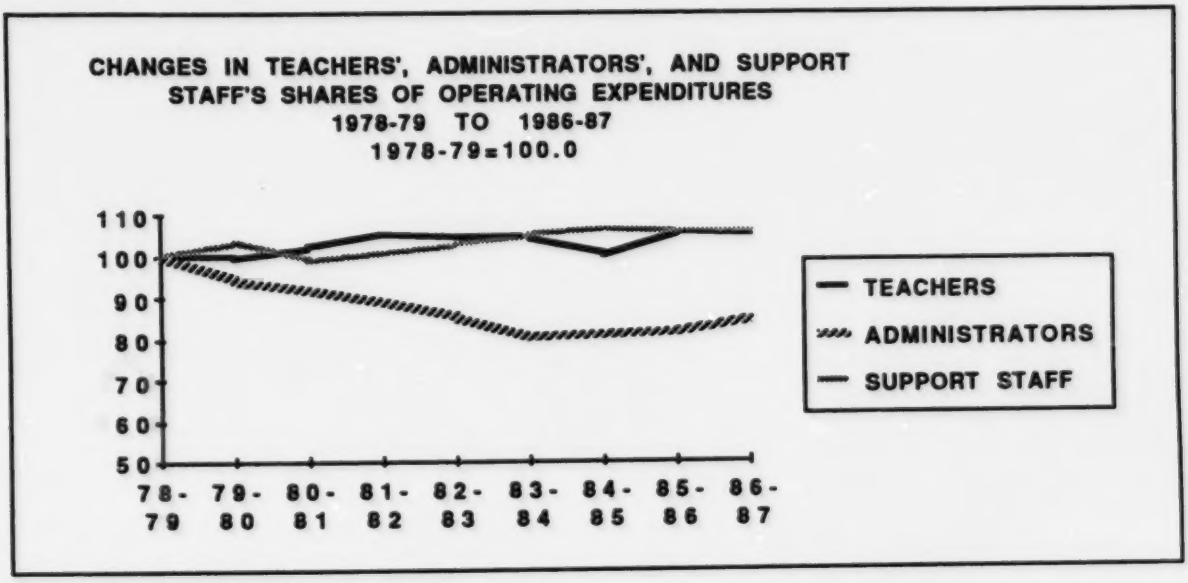
- Non-labour operating expenditures (e.g., instructional supplies, office supplies, and utilities) accounted for 14% of total operating expenditures in 1986-87. Little variation in this percentage occurred over the period 1978-79 to 1986-87.

- Capital expenses (e.g., equipment and buildings) funded from operating revenues accounted for 5% of total operating expenditures in 1986-87. During the period 1978-79 to 1980-81 these expenditures constituted almost 7% of operating expenditures; between 1981-82 and 1986-87, however, this

percentage has tended to be somewhat lower, falling within the range of 4.9% to 5.9% in all but one year.

Note: In addition to the expenditures colleges make on capital out of their operating revenues, colleges receive specific capital allocations for equipment and buildings. These allocations and the associated expenditures are not reflected in the figures reported above.

- 'Other' expenditures (e.g., ancillary enterprises), which represented 3.2% of total operating expenditures in 1986-87, have fluctuated from a share high of 3.5% in 1981-82 and 1982-83 to a low of 2.7% in 1978-79.




Source: Ontario College Information System

- The chart above shows (in index form) the changes in the teachers', administrators', and support staff's shares of total operating expenditures over the period 1978-79 to 1986-87. The shares of both teachers and support staff have increased since 1978-79, while the percentage of total expenditures related to expenditures on administrative labour has declined.

- The teachers' share increased from 45.7% in 1978-79 to 48.1% in 1986-87, a 5.3% increase and the support staff share increased from 17.6% to 18.6%, or 5.7%; but the administrators' share decreased from 12.6% to 10.7%, a 15% decrease.

**Issues/Implications**

- Education has always been viewed as a very labour intensive activity and the data on college expenditures do nothing to contradict this view. In fact, even with the advent of computerized learning and administrative systems, the labour intensity of the system has increased since 1978-79.

- While real productivity gains in an education sector are possible, history would suggest that productivity gains in this sector will not keep pace with gains in other more technologically-based sectors. As a result, if college wage rates increase at about the same rate as those in sectors experiencing higher productivity growth, per unit (student) costs in the college sector will rise relative to the per unit costs of other types of production .

- Rising *relative* unit costs of education and training would suggest that governments will always be under considerable pressure to curtail expenditures on the college system. However, when assessing what the public investment in the college system should be, one should, in addition to the rising relative unit costs of education, also take into account that: (i) productivity growth in other sectors does provide a means for paying for the rising relative costs of education; (ii) the education and training provided in the college system is a significant contributor to the productivity growth in other sectors; and (iii) benefits from training and educational investments accrue not only to the individuals undertaking the training but, also, to society at large in the form of a more informed and understanding citizenry. (For an expansion of these arguments, see W.J. Baumol, Economic Dynamics, The MacMillan Company, 1970) The colleges, probably in some collective manner, may need to focus more on assisting the government in informing the public at large of the benefits of public investment in the college system.

- The information and time available do not permit us to comment on whether resources devoted to expenditure items such as instructional equipment and professional development of college staff are adequate to ensure quality training. However, there are some concerns about the manner in which these items are funded by government. In the case of professional development and to a significant extent in the case of instructional equipment, colleges allocate funds to these items from their general operating revenues. In times of financial constraint, college administrators are often faced with the decision of choosing between staff lay-offs and reductions in staff development and equipment expenditures. The natural and quite laudable tendency is for administrators to attempt to minimize lay-offs at the expense of expenditures on staff development and equipment. While such behaviour may minimize the impact of financial restraint on staff morale and accessibility, it may also, in net terms, adversely affect the quality of training being provided, particularly if colleges face prolonged periods of restraint. If a greater percentage of government funds were targeted specifically for professional development and equipment/plant expenditures, the ability of colleges to impose 'forced savings' on these items would be reduced. Although we do not have a specific recommendation to make regarding the method of funding of professional development and equipment purchases, we urge that Vision 2000 explore the advantages and disadvantages of providing, to a greater extent than at present, specific grants for selected (and limited number of ) expenditure items of colleges.

**Related Background Documents Available at Council of Regents**

Howard Rundle, Mini -Project #29 - College Expenditure Patterns, 1989.

## Age Distribution of College Staff and Human Resource Development (Project #15)

### Findings

- By the year 2000, over one-fifth of current teachers and administrators will be 65 years or older.
- About 50% of current teachers and administrators will have retired by the year 2005.
- As the year 2000 approaches, the largest number of faculty, in terms of 5 year age groups, will be in the 50-54 year old age range.

**Statistics Relating to College Employees' Age Distribution***

| Age Statistics as of 1/1/1987 | All | Faculty | Support | Admin. | Male | Female |
|---|---|---|---|---|---|---|
| Mean Age | 43 | 44 | 40 | 44 | 44 | 41 |
| Mode | 39 | 43 | 38 | 44 | 44 | 40 |
| Median Age | 42 | 43 | 38 | 44 | 44 | 40 |
| 1st Quartile | 35 | 39 | 31 | 38 | 38 | 38 |
| 3rd Quartile | 51 | 51 | 49 | 50 | 52 | 49 |
| **% who will be:** | | | | | | |
| 65 or older in the year 2000 | 20% | 20% | 18% | 22% | 24% | 15% |
| Retiring by 2005 (Assumes average ret. age of 62) | 44% | 49% | 36% | 50% | 51% | 37% |

*These statistics relate to the 15,746 full-time employees of the college system who are enroled in the College Pension Plan. Excluded are approximately 400 faculty and 100 administrators who are members of the Teachers' Superannuation Fund; these excluded employees would tend, on average, to be older than those belonging to the College Pension Plan.

- Recently a task force established by the Committee of Presidents completed a study entitled, Human Resource Development in the Third Decade. The study involved 376 college system employees with representation from faculty, administration, support staff, and Boards of Governors. Participants indicated (among other things) that:
  - more opportunities for orientation of new staff and career development of existing staff were needed;
  - specific programs were required to help employees keep their skills current; and
  - performance excellence should be more widely recognized and performance standards should be mutually set, while at the same time managers should be held accountable for the development of their staff.

**Issues/Implications**

- With the increasing numbers of new faculty who will be hired to replace retiring teachers, some form of 'compulsory' teacher training for all new teachers may be required to ensure that overall standards of teaching do not decline in the college system.

- With increasing numbers of teachers and administrators reaching and moving beyond the mid-point of their working lives, opportunities for these employees to keep current in their fields will need to be provided. More linkages with employers might be developed so that college staff may obtain first hand experience in the changing environments of business and industry.

- The relatively large number of retirements which will occur in the next decade and beyond provide colleges with an opportunity to alter, if indicated, the mix of their employees to better reflect the demographic/cultural characteristics of their student bodies and communities.

- As human resource development expenditures are often among the first to be cut in times of budgetary restraint, the question arises as whether MCU should target some grant funds specifically for human resource development in the college system.

**Related Background Documents Available at Council of Regents**

Bob Bernhardt, Mini-Project #15 - Age Distribution of Faculty and Human Resource Development, 1989

Empirical Features of the College System

Background Papers

David K. Foot
Professor of Economics
University of Toronto

and

Maia MacNiven
Department of Economics
University of Toronto

# The Determinants of Enrolment Rates and Enrolments in Ontario Community Colleges

Study Team 1

# The Determinants of Enrolment Rates and Enrolments in Ontario Community Colleges


## Summary

The results presented in this paper confirm the appropriateness of the model based on three complementary theories — the consumption, investment and cohort size theories — of educational demand proposed by Foot and Pervin (1983) to analyze post-secondary enrolment rates. Not only are statistically significant results obtained, this time in the community college setting, but they remain robust over a variety of equation specifications and remain applicable in the post-1984 environment of stagnant college enrolments. Interesting results include the finding that, in general, college enrolments are subject to highly elastic income responses and quite inelastic price (fee) responses. On average, after accounting for the economic determinants, females have lower rates than males, except in the 20 to 24 age group. It appears that males have slightly lower income elasticities and higher price elasticities in comparison to females, although the differences generally are not statistically significant. Moreover, results with age specific groups suggest that income elasticities increase with age and price elasticities decline with age. This suggests that increasing tuition fees (above the rate of inflation) — a possibly attractive option when price elasticities are inelastic — will have a greater impact on the younger student, while a downturn in the macroeconomy is likely to have a greater impact on the older student.

The estimated enrolment rate equations are used to project enrolment rates into the 1990s. The general finding is that these rates are likely to increase over this period due primarily to income growth in the economy. An analysis of likely full-time post-secondary college enrolment trends over the 1990s, developed by combining the enrolment rate projections with relevant population projections for the province, projects a continuation of the current nongrowing enrolments into the 1990s, with the potential for substantial increases after 1994. These projected increases, however, are largely attributable to continued economic buoyancy which attracts the nontraditional, older students. The ability of the college system in Ontario to realize these potential increases in enrolment will hinge on its ability to attract and accommodate the educational requirements of the nontraditional (25 years and over) student.

## Les facteurs déterminants des taux d'inscription et des effectifs des collèges communautaires de l'Ontario

### Sommaire

Les résultats présentés dans le présent document confirment le bien-fondé du modèle qui repose sur trois théories complémentaires, relatives à la demande en matière d'enseignement, à savoir les théories de la consommation, du coût et de l'importance des effectifs; ce modèle fut proposé par Foot and Pervin (1983) pour analyser les taux d'inscription au niveau postsecondaire. Non seulement les résultats obtenus sont-ils significatifs sur le plan statistique, cette fois dans le cadre des collèges communautaires, mais ils se vérifient pour un certain nombre de variables et restent valables dans la situation stagnante, postérieure à 1984, des effectifs collégiaux. Parmi les résultats intéressants, citons la constatation que, en règle générale, l'inscription à un collège est un phénomène très élastique par rapport au revenu très peu élastique et par rapport aux frais de scolarité. Dans l'ensemble, compte tenu des facteurs économiques déterminants, les taux sont plus bas pour les femmes que pour les hommes, sauf pour la tranche d'âge de 20 à 24 ans. Il semblerait que l'élasticité par rapport au revenu soit légèrement plus basse et l'élasticité par rapport aux frais, plus élevée chez les hommes que chez les femmes, quoique ces différences ne soient généralement pas significatives du point de vue statistique. En outre, les résultats obtenus par tranche d'âge semblent indiquer que l'élasticité par rapport au revenu est directement proportionnelle à l'âge, tandis que l'élasticité par rapport aux frais est indirectement proportionnelle à cette variable; ainsi, la hausse des frais de scolarité (à un rythme supérieur au taux d'inflation) -option intéressante lorsqu'un phénomène est inélastique par rapport au prix - toucherait davantage les étudiants plus jeunes, alors qu'une baisse de l'économie pourrait avoir un plus grand effet sur les étudiants plus âgés.

On s'est servi des équations du taux d'inscription estimatif pour faire des projections sur les taux d'effectifs des années 90. On en est arrivé à la conclusion que ces taux vont probablement augmenter au cours de cette période, surtout à cause de la croissance des revenus dans l'économie. Une analyse des tendances possibles des effectifs d'étudiants à plein temps dans les collèges postsecondaires durant cette décennie, obtenues en combinant les projections quant aux taux d'inscription et les projections démographiques pertinentes relatives à la province, laisse prévoir le maintien de la stagnation actuelle des effectifs dans les années 90, avec des possibilités d'accroissement substantiel après 1994. Cependant, cette hausse prévue est surtout due à la vigueur de l'économie, qui attire les étudiants adultes non traditionnels. Le réseau collégial ontarien pourra d'autant mieux voir se réaliser cette possible augmentation des effectifs qu'il pourra attirer les étudiants adultes, non traditionnels, de 25 ans et plus et répondre à leurs besoins en matière d'enseignement.

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## Introduction

In a previous paper, Foot and Pervin (1983) explored the determinants of post-secondary enrolment rates in Ontario. Using various theories of educational demand, they found that the model was confirmed for both undergraduate and graduate university enrolments which was the main focus of their study. For community college enrolment rates, incorrect (although insignificant) signs were obtained for some of the explanatory variables. Using their university results, the authors then evaluated likely future developments and concluded that "public policy towards post-secondary institutions, especially universities, should not be determined on the basis of substantial anticipated enrolment declines" (p. 20). Given the enrolments of the 1980s, this evaluation has, in fact, turned out to be correct.

The purpose of this paper is not to justify or to evaluate the methodology or findings of the Foot-Pervin study. Rather it is to examine, in more detail, their findings for community colleges. In particular, this study revisits the model estimated by Foot and Pervin using better measures of the explanatory variables, particularly the price and cohort variables, and incorporates more recent data. Unlike the previous findings, the new estimates yield statistically strong confirmation of the Foot-Pervin model for community colleges. Moreover, the results remain robust over a variety of alternative equation specifications and data sets.

With these statistically significant results for college enrolment rates, together with projections of the college-aged population and the relevant explanatory variables, projections of future community college enrolments over the 1990s are developed. This is particularly relevant at this time. The levelling off in college enrolments since 1984 has signalled the cessation of enrolment growth, which had been the dominant scenario for the community college system in Ontario since its establishment in 1967. This new enrolment trend has led to a reevaluation of the role of the college system over the 1990s. The findings of this research have relevance not only for the future financial viability of the system and its employees, but also for the academic content of its programs and the efficient use of the college facilities from a public policy viewpoint.

The next section of the paper provides the methodological and theoretical framework for the analysis. The relevant data are then discussed including a brief review of demographic considerations. This is followed by new statistical estimates of enrolment rate equations (by gender and age) and a discussion of their implications. A subsequent section explores the likely future for college enrolments. A concluding section then develops the policy implications associated with the findings.

## Theoretical Framework

Following the methodology outlined in Foot (1982, 1985), enrolments can be broken into two components using the simple identity relationship

$$E_t = \frac{(E_t)P_t}{P_t} = (ENR_t)P_t \qquad (1)$$

where $E_t$ = enrolments in period t,

$ENR_t = \frac{E_t}{P_t}$ = enrolment rate in period t,

$P_t$ = population in period t.

Equation (1) can be easily made age and/or gender specific by introducing age and/or gender specific enrolment rates and summing over the relevant groups; that is

$$E_t = \sum_{i=1}^{N} E_{it} = \sum_{i=1}^{N} (ENR_{it})P_{it} \qquad (2)$$

where the summation is over N age/gender groups. This framework identifies the two components as (i) the enrolment rate(s) and (ii) the population size(s) in each group. Therefore, evaluations of enrolment growth, both historical and projected, depend on these two components and their determinants.

Theoretical determinants of the enrolment rate based on economic theories of educational demand are outlined in Foot and Pervin (1983).[1] They identify three relevant theories of educational demand: the consumption theory, the investment theory and the cohort size theory. The consumption theory treats education as a normal consumer good that yields satisfaction (or utility) and suggests that educational demand depends, in part, on the income of the consumer and the relative price of education. An increase in income, all other things remaining unchanged, enables the consumer to purchase more of all goods, including education. As a result a positive association is anticipated. An increase in relative prices under the same unchanged conditions has the opposite effect. Consequently, educational fee increases which do not keep up with general inflation result in a reduction in relative prices and an increase in educational demand, and vice versa. Because of the policy implications, concern over the elasticities associated with these two variables has a long history in the educational literature (see, for example, Campbell and Siegel (1967) in the U.S.; Handa (1972) in Canada; Pissarides (1982) in the U.K.).

Rather than a consumer decision, the investment theory views education as an investment decision where the decision to acquire is determined by a comparison of the 'up-front' costs with the (discounted) expected future returns (or benefits) that are likely to accrue from the education. Traditionally, these are viewed as the increases in income (wages and salaries) that are attributable to the educational training, degree or diploma. An increase in costs (such as fees), all other things remaining unchanged, will lead to the marginal 'investor' postponing or eliminating demand for education, and vice versa. An increase in expected benefits will have the opposite effect. This approach also suggests that an increase in unemployment is likely to increase the demand for education, since it reduces the expected income foregone (or opportunity costs) of the investment decision and hence the net present value of a post-secondary education. This positive association was found by Handa and Skolnick (1975) in a study of university enrolment in Ontario, and was confirmed by Foot and Pervin (1983).

A related, but also distinct, theory is associated with the work of Easterlin (1980) who argues that the comparative size of one's generation is a crucial determinant of one's life chances and hence decisions, including the decision to obtain a post-secondary education. Of particular interest is the proposition that those born into large cohorts, such as the post-war baby-boomers, experience stiff competition for jobs, slow advancement, and relatively low wages, while those born into smaller cohorts have the opposite experiences. These labour market effects have found corroboration in the works of Freeman (1975, 1977), Bloom (1984) and others. As a result, persons born into large cohorts will experience fewer lifetime earnings from a post-secondary education than those born into smaller cohorts, and hence are unlikely to demand as much of it. A corollary of the Easterlin theory suggests that because these experiences influence the decisions to marry and have children, cycles of large cohorts producing small cohorts, and vice versa, tend to repeat themselves, therefore making predictions of the future possible.

As noted by Foot and Pervin (1983), these three theories tend to be mutually reinforcing, and hence provide complementary rather than competing explanations of enrolment demand. The cohort size theory

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1 Only a brief review is provided here. Readers are referred to this article for more details.

provides a justification for the lifelong stream of benefits which is the basis of the investment theory. Quantitatively large cohorts experience relatively lower future benefits from an educational investment and, other things unchanged, can be expected to demand less education per person, and vice versa. Prices (as fees or costs) appear in both the consumption and the investment theories with an expected negative relationship with demand, while income **de facto** appears with a positive relationship in all three theories, either as a financing variable (in the consumption theory) or as a return to higher education variable (in the investment and cohort size theories).[2] Only unemployment may have an ambiguous effect on educational demand since increases in unemployment rates, while decreasing the opportunity costs and hence increasing the demand for education, may also decrease income and hence lower the demand for education. This underscores the need to control for income when evaluating the effect of unemployment (Crean, 1971; Handa and Skolnick, 1972).

The comprehensive view represented by these theories led Foot and Pervin (1983) to estimate the following specification for enrolment rates (ENR) in Ontario:

$$ENR_t = ß_0 + ß_1 INCOME_t + ß_2 PRICE_t + ß_3 URATE_t + ß_4 COHORT_t + u_t \qquad (3)$$

where $u_t$ is an error term and the parameters (ß's) were expected to assume the following signs based on the above theories[3]

$$ß_1 > 0 \; , \; ß_2 < 0 \; , \; ß_3 > 0 \text{ and } ß_4 < 0 \; ;$$

that is, increases in enrolment rates are associated with increases in income, decreases in price (fees), increases in unemployment rates and decreases in cohort size, and vice versa.[4]

As one of the two components in equation (1), this specification can also provide a framework for the generalization suggested by equation (2) by defining equation (3) in age and/or gender terms (that is, with $ENR_{it}$ as the dependent variable). Under these conditions it is perhaps appropriate to express the relevant explanatory variables — URATE and COHORT — in the same terms. This is discussed further in the section of this report entitled 'Results.'

Finally, note that the dependent variable in equation (3) can be interpreted as the probability that a college aged person will enrol in college. It is, therefore, based in the binary choice literature that pervades much of the empirical work on individual decision making in economics (Ameniya, 1981). Since the purpose of this paper is aggregative in nature — being concerned with the determinants of the province-wide enrolment rate over time — the above specification can be reinterpreted as an aggregation of individual choices in each time period. The estimation issues associated with such an interpretation are also examined in the section below entitled 'Results.'

The second major determinant of enrolments is the population size and its age-gender composition. These demographic variables are influenced by fertility and survival rates and by migration patterns, both

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2 Income can also be viewed as a financing variable in the cohort size theory via the sibling effect (see Ahlburg, Crimmins and Easterlin, 1981).

3 Here URATE has been substituted for the opportunity cost variable with the consequent reversion in sign (since increasing unemployment rates imply reduced opportunity costs, and vice versa).

4 Adopting a demand-theory approach implicitly assumes an elastic supply of potential enrollees and no capacity constraints. While likely to be a reasonable assumption in Ontario over the historical period it is subject to further examination below.

international and interregional. An analysis of these patterns is beyond the scope of this paper (see Foot, 1982). Of particular interest, however, is the fertility profile, which peaked in Ontario in 1960 at 3.79 children per woman and thereafter declined dramatically to the current level of around 1.6 children per woman. This mirrors the Canadian fertility profile which created one of the largest 'baby-boom' generations in the developed world. It spawned the substantial enrolment increases in post-secondary enrolments in Canada over the 1960 and 1970s[5] — which is one of the reasons why the cohort size variables is so important in Canada.[6] Thereafter, enrolments came from the tail-end of the baby-boom generation over the late 1970s and early 1980s, and more recently enrollees from the post mid-1960s 'baby-bust' generation have been entering Ontario's post-secondary institutions. The maintenance of enrolments in the face of these quantitatively much smaller cohorts,[7] has been accomplished by increases in enrolment rates and by the increased admission of students from the nontraditional age groups (that is, over 25 years). Both of these are important trends that deserve evaluation in any prognosis of the future of the college system in Ontario.

While the remaining demographic patterns are also important determinants of provincial population size and growth, they are less important in determining educational enrolments. Survival rates largely influence the older age groups in society and these groups are not large demanders of traditional post-secondary instruction. Similarly, migration patterns tend to be largely influenced by people who have finished their education and are moving in search of employment. Nonetheless, educational retraining and upgrading remain potential sources of educational demand although, again, not always in the traditional delivery mode. Note, however, that the population variables in equations (1) and (2) do reflect these patterns and the enrolment rates, as defined, assume that some proportion of these migrants do attend post-secondary educational institutions.[8]

## Data

This section presents a brief review of the data used to estimate the enrolment rate equation outlined in the previous section. The conflicting impacts of the empirical trends of the explanatory variables over the historical period are noted. The results of the estimation are presented subsequently in the section entitled 'Results.' These are then used to project enrolments into the 1990s and these results, along with the necessary data, are reviewed in the section entitled 'Projections and Implications.'

The community college system in Ontario was established by the provincial government in 1967. Since then the number of full-time post-secondary students has increased steadily to a maximum of 96,400 students in 1984. Thereafter, enrolments have remained in the 95,000 range. This represents over six percent

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5 The first baby-boomers born in Canada in 1947 reached age 18 in 1965, while the peak of the baby-boom generation born in 1960 reached age 18 in 1978 and the tail-end, born in 1966, reached age 18 in 1984.

6 It is also important in the U.S. (Ahlberg, Crimmins and Easterlin, 1981) and in Australia and New Zealand which have similar baby-boom generations.

7 For example, the 15 to 19 age cohort in Ontario numbered 691,000 in 1986 compared to 816,000 in the 20 to 24 age cohort.

8 In the empirical work that follows, it is implicitly assumed that where foreign students are involved they respond to the variable in a similar manner to domestic students.

of the population aged 15 to 24 years,[9] up from around 3.5 percent in the early 1970s. Consequently, the community college system in Ontario experienced rapid growth over the 1970s, but has been faced by a levelling off in enrolment growth since 1984.

As noted by Foot and Pervin (1983), the satisfactory measurement of the explanatory variables suggested by the theories remains a challenge of empirical research. As previously inferred, the general unavailability of individual-specific (cross-section) data has resulted in many researchers in this discipline turning to aggregate data to test theories.[10] This requires the use of proxy measures of the relevant theoretical constructs at the aggregate level. Moreover, since it is at this level that much of the policy debate centres, these measures tend to be chosen from widely available and respected data sources, so that the debates may focus on issues rather than on the possible measurement problems associated with each specific variable.

Following Foot and Pervin (1983), the **income** variable is measured as real personal disposable income per capita in the province. Over the twenty year period 1967 to 1987 this variable increased from $6,860 ($1981) to $11,440 per capita for an average annual growth of 2.6 percent. However, over the 1980s the growth has been a much slower 1.6 percent per annum. Since a positive association with the enrolment rate is anticipated, this might help explain the slower growth of the enrolment rate over the 1980s.

In this study, a more satisfactory measure of the **price** variable is employed compared to Foot and Pervin, who used a proxy measure of real operating grants per student. For this study, a relative price variable was constructed by taking the total fees paid by students and dividing by the number of students and the consumer price index. The resulting real fees per student is used to test both the consumption and the investment theories, since tuition is a major portion of the direct out-of-pocket costs of a college education. This variable increases from almost $460 ($1981) in 1968 to almost $720 in 1987, an average increase of 2.4 percent per annum in real terms. However, this variable peaked in the mid-1970s,[11] so that over the decade 1977-87 this variable has actually declined from $870 to $720 ($1981). Since a negative association with the enrolment rate is expected by both theories, this variable could have been expected to increase educational demand over this period.

The third explanatory variable — **opportunity cost** — is measured by the unemployment rate for youth. This rate rose from a low of 5.6 percent in 1969 to a high of 17.8 percent during the recession year of 1983. It has since declined to levels experienced in the early 1970s. Since a positive association with the enrolment rate is anticipated, the increases over the 1970s and early 1980s would be expected to drive up enrolment rates and the subsequent declines since 1984 could be expected to have contributed to a reduction in the college enrolment rate.

Finally, to capture the influence of Easterlin's **cohort size** theory on enrolment rates, a direct measure that expresses the youth age group as a percentage of the working age population in the province is used. This measure departs from the approach used by Ahlburg, Crimmins and Easterlin (1981) and by Foot and Pervin (1983) who employed lagged fertility rates as a proxy measure. It seems preferable to use the direct rather than the proxy measure for this variable, although both follow a very similar pattern. In general, this variable increases over the 1960s and 1970s to a peak (of 19.2 percent) in 1979 and thereafter declines

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9 In 1987, approximately 84 percent of community college students were in this age range, down from 90 percent a decade earlier.

10 Some exceptions are Anisef, McAdam and Ting (1986, 1987), Foot and Stokes (1989), and Stokes (1988).

11 According to Statistics Canada, tuition fees for 1976 should be considered as an outlier, as a result of the instigation of a new survey.

noticeably to a 1987 level comparable to the 1967 level (of 16.1 percent). Since a negative association with enrolment rates is hypothesized, the influence of this variable is for declining enrolment rates over the 1960s and 1970s, followed by increasing enrolment rates over the 1980s.

Gender and age disaggregations are also considered in the results that follow. In general, the data trends briefly reviewed in this section apply at these disaggregated levels. Where notable exceptions occur, these will be mentioned in the discussion of results.

In concluding this brief review of the trends in the data, it is probably useful to underscore the complexity of the theories even at this aggregative level. While the theories are complementary, the empirical trends indicated by the determining variables clearly are not. Over the 1980s, for example, this data review suggests that college enrolment rates in Ontario have been depressed by slower income growth relative to the 1970s and by declining youth unemployment rates, but have been stimulated by reductions in real fees and declining cohort sizes. Under these conditions it is, perhaps, no surprise that enrolments have remained relatively level.

## Results

The results of estimating the enrolment rate specification outlined in the theoretical review using the data discussed above are presented in this section. Tables 1 and 2 include results for a longer time period (1968-87) but without age detail, while Tables 3 and 4 contain results for a shorter period (1977-87) but with age detail. Table 5 summarizes the associated income and price elasticity estimates by gender. (For tables 1 through 5, see Appendix.)

The model estimates in Table 1 relate to total full-time post-secondary enrolment rates in Ontario community colleges over the period 1968 to 1987. As noted previously, this covers the period after the college system because established and includes periods of both rising and stagnating enrolment rates. Since theory only provides a guide as to the content but not the functional form of the specification, three alternative functional forms are estimated. The linear specification includes all variables entered linearly, while the (double) log specification includes all continuous variables entered as (natural) logarithms. The latter functional form has the well-known property of providing (constant) elasticity estimates for the estimation period. Finally, being based on an aggregation of individual qualitative choices, the above functional forms incorporate heteroscedasticity introduced by the grouping of observations and results in a dependent variable (the enrolment rate) that has a probabilistic interpretation with a constrained range of between zero and 100 percent. Under these conditions, logit estimation has been suggested as the appropriate estimation technique (Pissarides, 1982). Estimation under these three alternative specifications also has the advantage of providing an indication of the robustness of the results over alternative functional forms.

The results presented in Table 1 provide a striking confirmation of the three theories outlined in the section entitled 'Theoretical Framework.' Not only are all the estimated parameters on the explanatory variables of expected sign, but they are all statistically significant at better than the five percent level of significance.[12] Moreover, the equation statistics are very satisfactory.[13] All estimated parameters on the income variable are positive and significant at high levels of significance, and the estimate in the logarithmic form indicates an income elasticity of 1.37 which is significantly above unity (that is, elastic).

12 Since theory provides expected signs on the variables, one-tail tests are appropriate. With 15 degrees of freedom, the relevant critical t-values are 1.75 at the five percent level and 2.60 at the one percent level of significance.

13 The Durbin-Watson (DW) statistic is in the indeterminate range of 0.90 to 1.83 at the five percent level.

Likewise, all estimated parameters on the price (fees) variable are negative and significant, and the estimate in the logarithmic form suggests an elasticity of 0.26 which is significantly below unity (that is, inelastic). The estimated parameters on the unemployment rate, which are all significant at better than the one percent level, suggest that each percentage point decrease in the unemployment rate decreases the enrolment rate by 0.11 percentage points — an elasticity of only 0.23 — while the parameter estimates on the cohort size variable indicate that each percentage point decline in the cohort size increases the enrolment rate by almost one-half of a percentage point — an elasticity of almost 1.6, which incidentally is not significantly above unity.

These results not only provide confirmation of the contribution of each of the three theories outlined in previously in the section entitled 'Theoretical Framework,' but they also verify the application of the Foot-Pervin model to the community college setting in Canada. Moreover, they confirm their initial findings of a relatively high income elasticity and a relatively low price elasticity.[14]

In Table 2 these results are disaggregated by gender. This is first accomplished by pooling the enrolment rates and introducing a dummy variable into the pooled regression. The sign on this variable turns out to be significantly negative thereby indicating that once the economic determinants have been accounted for, females have lower college enrolment rates than males. Note, once again, the elastic income parameter and the inelastic price parameter in the logarithmic form. The results for males and females separately yield interesting and important findings. They further confirm the three theories for each gender and suggest that, on average, males have slightly lower income elasticities and higher price elasticities in comparison to females, although the two are not significantly different (see Table 5). In addition, the effects of unemployment and cohort size are not noticeably different, although both have a slightly larger impact on male rates compared to female rates. This suggests that the education decision may be slightly more sensitive to labour market conditions for males. Note, once again, that the almost universal significance of the parameters over these gender-disaggregated equations and the satisfactory equation statistics provide further confirmation of the robustness of the estimated model.

Disaggregation by gender is only one way to examine the applicability of the theories to more disaggregated settings; another is to disaggregate by age. Consistent data on college enrolments by age are only available from the mid-1970s.[15] For the purposes of this study, three relevant age groups were considered: under 20, 20 to 24, and 25 years and over. By 1987 these comprised 36.2, 47.3 and 16.4 percent respectively of college enrolments in the province compared to 48.0, 41.6 and 10.3 percent a decade earlier (1976). In fact, it is the gradual trend towards the older student that makes the age disaggregation particularly interesting.

The initial results for both genders combined are presented in Table 3. In comparison to the previous results, the most apparent finding is the universal insignificance of the cohort size variable. Perhaps this is not surprising because that the time period is too short to capture the effects of the longer-run trends that this variable is attempting to proxy. For this reason, the cohort size variable was eliminated from subsequent regressions with these data.

These results (see Table 4) again provide strong confirmation of the theories presented in the section entitled 'Theoretical Framework' and provide useful new information. The estimated income parameters are always positive and very significant regardless of age group or functional form. Moreover, results from the logarithmic equation suggest not only an elastic response in all age groups, but also one that increases

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14 The price elasticity for community colleges estimated by Foot and Pervin (1983) was not significantly different from zero.

15 These data were kindly provided to the authors by the College Affairs Branch of the Ontario Ministry of Colleges and Universities.

with age. However, the opposite finding occurs for price elasticity where the higher absolute (although still inelastic) response occurs in the younger age groups and the effect declines to nonsignificance in the oldest age group. This confirms the, perhaps not surprising, findings that increasing tuition fees will have a greater impact on the younger student, but that an economic downturn is likely to have a greater impact on the older student.

The effects of economic conditions are also reflected in the high and universal significance of the unemployment rate in each age group, with results that show no clear differences between the age groups. Elasticity estimates (from the logarithmic equation) vary from 0.37 to 0.46 with no clear relationship to age, although perhaps the more marginal students at either end of the age spectrum are slightly more affected than the students from the more traditional student age group (of 20 to 24 years).

Finally, after accounting for the effects of these economic variables, the estimated parameters on the gender dummy variables indicate that enrolment rates are higher for females in the youngest and oldest age groups, and higher for males in the more traditional post-secondary student age group.

Despite the limited degrees of freedom the equation statistics for these equations are generally satisfactory, although there is the appearance of positive first-order autocorrelation in the middle age group for the logarithmic and logit forms, and in the upper age group for the linear form.[16]

Two extensions of the basic model were explored. First, following Foot and Pervin (1983) a 'competition' variable was introduced into the equations in the form of the university enrolment rate over the period. The estimated coefficient on this variable invariably turned out to be positive and insignificant, thereby providing no evidence for competition between the two systems — a finding also reported in Foot and Pervin. It is, however, difficult to envisage the alternative conclusion of complementarity between contemporaneous enrolment rates; rather, the results suggest that there is likely a simultaneous determination between the two and that they should not be entered as an exogenous variable in the 'other' rate equation. Second, in an attempt to explore the possible effects of supply constraints on these demand-driven estimates, a variable measuring the number of colleges represented in the enrolments in the dependent variable was introduced as an additional explanatory variable in all equations. Almost without exception this turned out to be positive (as expected) and significant, and left the remaining parameter estimates (except the constant) unaffected. For example in the logarithmic equation the variable enters with an estimated coefficient of 0.057 (and a t-statistic of 2.93) and the estimated income and price elasticities become 1.12 and -0.30 respectively, a change of less than 20 percent. These results do suggest that a capacity constraint may have been in operation, most likely in the early years of the system, and that the availability of additional college places contributed to increasing the enrolment rate. This would no longer seem to be applicable today where the number of colleges has been unchanged for a number of years.

In summary, the results presented in this section for the determinants of community college enrolment rates in Ontario, provide strong confirmation of the model developed by Foot and Pervin (1983). Not only is the setting different — college instead of university — but the period is also somewhat different, having been extended to include the new enrolment environment of the 1980s. Moreover, disaggregations by gender, age, and (implicitly) time leave the basic conclusions unchanged. In essence, college enrolments are subject to relatively high income elasticities and low, but significant, price (in)elasticities, and are influenced by opportunity costs proxied by the unemployment rate. Cohort size is also a significant factor over a longer time period. In general, there are few significant gender differences, although males tend to have lower income and higher price elasticities. There are, however, more noticeable age differences with income elasticities increasing with age, and price elasticities declining with age.

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16 The five percent lower bound for the DW statistic in these cases is 0.96. Correction by appropriate techniques did not produce better results.

These latter findings may be of particular relevance to a system now finding itself operating in an increasingly aging society, and it is to these types of implications that the following section is devoted.

## Projections and Implications

According to the methodological framework summarized in equations (1) and/or (2), projections of college enrolments into the future (e.g., the 1990s) require projections of the two component parts; namely, enrolment rates and population.

Population projections at the provincial level are now well established. Both the federal statistical agency Statistics Canada and the provincial Ministry of Treasury and Economics produce population projections under a variety of alternative demographic assumptions (primarily on fertility and migration). It should be noted, in passing, that alternative fertility scenarios are largely irrelevant to college enrolments in the 1990s since a change in fertility will not be reflected in college enrolments for at least 17 years. Any debate as to the choice of population projection therefore centres on the migration assumptions. In this regard, the four scenarios released by Statistics Canada are not very helpful, since only the 'high fertility, high immigration' scenario contains the 'most likely' internal migration pattern (Pattern B). For this reason it was decided to use the 'base' scenario provided by the Ontario Ministry of Treasury and Economics as the population projection for this study.[17]

Enrolment projections can be made solely on the basis of population projections by holding (age-gender specific) enrolment rates at their current levels and applying equation (2). Note that for any age group, i, this equation can be rewritten as

$$E_{it} = ENR_{it} \left(\frac{P_{it}}{P_t}\right) P_t \qquad (4)$$

and hence the growth in enrolments (denoted $E_{it}$) can be expressed as the summation of the growth in the three components; that is,

$$\dot{E}_{it} = \dot{ENR}_{it} + \dot{\rho}_{it} + \dot{P}_t \qquad (5)$$

where the population share in each age group is defined as

$$\rho_{it} = \frac{P_{it}}{P_t} \quad .$$

This variable then ($\rho_{it}$) captures the effects of changing cohort sizes, or in other words, population aging. Hence result (5) can be expressed in words as:

| Enrolment Growth | = | Rate Growth | + | Population Aging | + | Population Growth |
|---|---|---|---|---|---|---|

17 This scenario includes constant fertility and migration to the province based on the average of the past decade.

In the case where rates are assumed constant, enrolment growth simply reflects population growth and aging.

Recent applications of this methodology indicate full-time post-secondary enrolment declines of around 6.3 percent over the 1988 level, or 8 percent over the peak 1984 level of enrolments as a result of these two factors. Since population is projected to grow by over 12.5 percent over this period, these projections represent substantial enrolment declines of around 20 percent as a result of the aging of the massive baby-boom generation beyond their college age years.[18] Consequently, it is not until their children, who have been born in the 1980s, reach college age commencing around 1998 that college enrolments start to grow slowly again. Despite a growing population, these enrolments still do not return to the peak level of 1984 until well into the first decade of next century.

An enrolment rate projection can now be added to these population-based projections. This can be based on the enrolment rate equations presented in the previous section, using projections of the explanatory variables.[19] Some speculation is, perhaps, in order to understand the likely outcomes. Continued growth in provincial real personal disposable income per capita will lead to increased rates, although declining (positive) growth will lead to more slowly growing rates. Any further erosion of real fees will lead to increased rates. Alternatively, any attempt to recoup some of the real losses of the past decade by increasing nominal fees above the rate of inflation will place downward pressure on rates. Declining unemployment rates will reduce college enrolment rates, while the inevitable decline in cohort size over most of the 1990s can be expected to increase rates. Without a quantitative framework, the actual outcome of these conflicting trends is, therefore, in doubt. The quantitative framework is provided by the equations estimated in the previous section.

In developing these projections, it will be assumed that there is no change in real fees; that is, nominal fee increases are assumed to match inflation rates. Projections of real personal disposable income per capita in the province indicate annual growth averaging only 1.1 percent over the 1990s. This growth will, however, place upward pressure on enrolment rates. Accompanying this growth is a gradual decline in the unemployment rate in the province of approximately three percentage points over the 1990s.[20] This reflects both continued buoyancy on the demand side and a reduced supply of entry-level workers. This will place downward pressure on enrolment rates. Projected declines in the relative cohort size of the 20 to 24 age group by almost one-third over the peak around 1983 will put upward pressure on enrolment rates in this age group.

The results of the projections are summarized in Table 6 (see Appendix) using the linear results presented in Table 4.[21] The projections show generally increasing enrolment rates in all age groups, thus confirming that the impacts of increasing per capita incomes more than offset the impacts of declining

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18 This is an approximation since the additive growth in equation (5) does not carry over the summation sign in equation (2).

19 Projections of the explanatory variables (real P.D.I. per capita and the unemployment rate in Ontario) to 2000 were kindly supplied to the authors by the Policy and Economic Analysis Program of the Institute for Policy Analysis at the University of Toronto.

20 These were translated into age-specific unemployment rates using autocorrelation corrected regressions relating each age-specific unemployment rate to the provincial unemployment rate. These equations were then used for projection purposes.

21 The enrolment rate projections were fine tuned on the 1988 values.

unemployment rates.[22] The projections reflect a macroeconomy that grows through the early 1990s, suffers a mild growth 'pause' in 1992, and thereafter grows steadily at a somewhat slower rate. This pattern is reflected in the projected enrolment rate patterns where there is a general decrease in rates in 1992, with 1991 rates being reestablished in 1993 and growing thereafter. Consequently, although realistic, this macroeconomic projection is relatively 'optimistic' and this optimism is reflected in the enrolment rate projections. A macroeconomic projection that includes an economic recession would produce lower enrolment rate projections.

Note that the projected enrolment rate increases are relatively larger for the older age groups, which reflects the higher income elasticities in these age groups. This has important implications in a society characterized by population aging. Over the 1990s, the massive baby-boom generation will be located entirely in the 25 years and over age group.[23] Consequently, this nontraditional post-secondary group provides an important source of students in the 1990s, particularly if their enrolment rates increase substantially as suggested by the above projections.

These postulates are confirmed in the college enrolment projections presented in Table 7 (see Appendix). The general pattern of these projections indicates a continuation of the current trend in enrolments through to 1993, after which noticeable growth is experienced. The 1984 peak in enrolments is reached again by 1994, and thereafter enrolment growth returns to the college system. Under these conditions, enrolments are over one-quarter above current levels by the turn of the century. This represents a growth that outstrips the growth in population over this period. However, it is important to realize that most of this growth occurs in the nontraditional age groups, which have high income elasticities. By the year 2000, students in the nontraditional, 25 years and over age group comprise nearly 24 percent of total enrolments, up from 16 percent in 1987.

Projections represent the logical consequences of the input assumptions. This 'optimistic' scenario for the community college system in Ontario may not be realized for a number of reasons. First, macroeconomic growth may not be as high and as stable as projected. The sensitivity of enrolment rates to macroeconomic variables has been established in the rate equations estimated in the section entitled 'Results.' A downturn in macroeconomic performance sometime over this period would result in lower enrolment rates and hence lower enrolments, especially among the income-sensitive older students. Second, these projections do not include the impact of the cohort size variable. While this is unlikely to be large over the 1990s, it should be noted that the size of the 17 to 19 age group reaches a minimum in 1996 and the 20 to 24 age group in 2000, after which the children of the baby-boomers start to enter the college system. Increases in competition, etc. among the members of this baby-boom 'echo' generation will likely place downward pressures on enrolment rates after these dates.

Third, and perhaps most importantly, much of the projected increase in enrolments comes from the nontraditional student.[24] These students, aged 25 and over, from the baby-boom generation, are likely to continue to experience negative cohort effects and these are not reflected in these enrolment projections. Moreover, the projections raise the issue of the ability of the college system to accommodate these students. Not only is this an issue of physical capacity, but it is also an issue of administrative, instructional and program capacities. Administratively these students make different demands on the educational system, often requiring mature age entry requirements and requesting academic credits for previous courses and

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22 Recall that real fees are held constant over the projection period, and that cohort size does not enter these specifications.

23 The tail end of the baby-boom generation, born in 1966, reaches age 25 in 1991.

24 In fact, if students aged 25 years and over are removed from the total, projected enrolment growth barely matches population growth over the period.

practical experience. Instructionally these students make different demands on instructors since they bring more 'life experiences' to the classroom. They are likely to be more aware of the opportunity cost of their time and hence more demanding on their instructors to make increasingly effective use of classroom hours. On the other hand, being older it is likely that teaching and evaluation methods will require extensive modifications. Finally, from a program viewpoint, older students are much more likely to be seeking retraining than training. This means the need to develop new courses and programs that make use of the basic skills and training already embodied in the older student. As a result these courses are likely to be 'higher level' courses and, in this respect, the colleges are likely to find themselves in direct competition with the universities to satisfy this educational demand.

Consequently, much of the 'optimism' of the above projected outlook for the college system over the 1990s is based on the ability to attract and accommodate the educational demands of the nontraditional, older student. Failure to appreciate this reality will result in significantly lower college enrolments (over the 1990s and beyond) than those outlined above.

## Conclusions

A number of interesting findings and implications can be drawn from the results presented in this paper. On a theoretical level, these results have confirmed the continued appropriateness of the model proposed by Foot and Pervin (1983) to analyze post-secondary enrolment rates. Not only are statistically significant results obtained, this time in the community college setting, but they remain robust over a variety of equation specifications and remain applicable in the post-1984 environment of nongrowing college enrolments. Interesting results include the finding that, in general, college enrolments are subject to highly elastic income responses and quite inelastic price (fee) responses. On average, after accounting for the economic determinants, females have lower enrolment rates than males except in the 20 to 24 age group. It appears that males have slightly lower income elasticities and higher price elasticities in comparison to females, although the differences generally are not statistically significant. Moreover, results with age specific groups suggest that income elasticities increase with age and price elasticities decline with age. This suggests that increasing tuition fees (above the rate of inflation) — a possibly attractive option when price elasticities are inelastic — will have a greater impact on the younger student, while a downturn in the macroeconomy is likely to have a greater impact on the older student.

The estimated enrolment rate equations are used to project enrolment rates into the 1990s. The general finding is that after a pause in the early 1990s, these rates are likely to increase over the later 1990s due primarily to income growth in the economy. A cessation of income growth due to a macroeconomic recession would considerably limit the projected enrolment increases. An analysis of likely full-time post-secondary college enrolment trends over the 1990s, developed by combining the enrolment rate projections with relevant population projections for the province, projects a continuation of the current nongrowing enrolments into the 1990s, with potentially substantial increases after 1994. These increases, however, are largely attributable to nontraditional, older students. The ability of the college system in Ontario to realize these potential increases in enrolment will hinge on its capacity to attract and accommodate the educational requirements of the nontraditional (25 years and over) student. This educational challenge of an aging society will need to be a cornerstone of the community college system in Ontario if it is to realize the full potential of the educational demands outlined in this study.

## Appendix

**Table 1**
**Determinants of Total Community College Enrolment Rates, Ontario, 1968-87**

| Equation Specification | Constant | Real P.D.I. per capita (+) | Real Fees (-) | Unemployment Rate (+) | Cohort Size (-) | Equation $R^2$ | Statistics DW |
|---|---|---|---|---|---|---|---|
| Levels | 7.069 | 0.623 | -1.242 | 0.111 | -0.494 | 0.961 | 1.37 |
| | (4.85) | (8.57) | (-2.46) | (4.18) | (-6.46) | | |
| Logs | 2.337 | 1.368 | -0.262 | 0.229 | -1.585 | 0.945 | 1.35 |
| | (1.78) | (6.54) | (-2.55) | (2.72) | (-4.28) | | |
| Logit | -2.996 | 0.150 | -0.302 | 0.023 | -0.087 | 0.951 | 1.32 |
| | (-8.16) | (8.19) | (-2.37) | (3.45) | (-4.51) | | |

Note: Numbers in parenthesis are t-statistics.

Table 2
Determinants of Community College Enrolment Rates by Gender, Ontario, 1968-87

| Equation Specification | Constant | Real P.D.I. per capita (+) | Real Fees (-) | Unemployment Rate (+) | Cohort Size (-) | Female Dummy | Equation Statistics R2 | DW |
|---|---|---|---|---|---|---|---|---|
| **POOLED:** | | | | | | | | |
| Levels | 7.268 | 0.639 | -0.743 | 0.109 | -0.494 | -0.312 | 0.953 | 1.18 |
| | (6.31) | (11.3) | (-3.80) | (5.25) | (-8.30) | (-3.33) | | |
| Logs | 2.042 | 1.477 | -0.341 | 0.213 | -1.474 | -0.062 | 0.934 | 1.12 |
| | (2.08) | (9.14) | (-4.39) | (3.21) | (-5.11) | (2.48) | | |
| Logit | -2.983 | 0.156 | -0.188 | 0.023 | -0.086 | -0.072 | 0.930 | 0.93 |
| | (-9.34) | (9.97) | (-3.46) | (3.93) | (-5.21) | (2.76) | | |
| **MALES:** | | | | | | | | |
| Levels | 8.235 | 0.546 | -0.765 | 0.122 | -0.504 | | 0.942 | 1.61 |
| | (5.34) | (6.99) | (-3.01) | (4.29) | (-6.25) | | | |
| Logs | 3.310 | 1.223 | -0.313 | 0.249 | -1.748 | | 0.919 | 1.52 |
| | (2.45) | (5.49) | (-3.17) | (2.85) | (-4.42) | | | |
| Logit | -2.503 | 0.127 | -0.188 | 0.025 | -0.099 | | 0.933 | 1.60 |
| | (-6.81) | (6.81) | (-3.11) | (3.74) | (-5.12) | | | |
| **FEMALES:** | | | | | | | | |
| Levels | 5.627 | 0.725 | -0.537 | 0.097 | -0.474 | | 0.970 | 1.23 |
| | (3.88) | (10.1) | (-1.99) | (3.65) | (-6.17) | | | |
| Logs | 1.265 | 1.613 | -0.225 | 0.203 | -1.335 | | 0.960 | 1.19 |
| | (1.06) | (8.09) | (-2.02) | (2.39) | (-3.75) | | | |
| Logit | -3.665 | 0.184 | -0.124 | 0.020 | -0.070 | | 0.960 | 1.09 |
| | (-9.52) | (9.67) | (-1.72) | (2.87) | (-3.43) | | | |

Note: Numbers in parenthesis are t-statistics.

**Table 3**
**Determinants of Community College Enrolment Rates by Age, Ontario, 1977-87**

| Equation Specification | Constant | Real P.D.I. per capita (+) | Real Fees (-) | Unemployment Rate (+) | Cohort Size (-) | Female Dummy | Equation $R^2$ | Statistics DW |
|---|---|---|---|---|---|---|---|---|
| 17-19 years | 2.897 | 0.629 | -2.485 | 0.206 | -0.379 | 2.307 | 0.964 | 1.54 |
| | (0.16) | (0.58) | (-2.58) | (3.30) | (-0.66) | (4.36) | | |
| 20-24 years | -6.966 | 1.334 | -0.883 | 0.136 | -0.196 | -1.141 | 0.972 | 1.12 |
| | (-1.75) | (9.00) | (-2.94) | (8.80) | (-1.04) | (7.28) | | |
| 25+ years | -0.944 | 0.083 | 0.019 | 0.011 | 0.002 | 0.040 | 0.928 | 0.90 |
| | (-1.98) | (4.42) | (0.67) | (3.70) | (0.20) | (3.11) | | |

Notes: These equations were estimated using the levels specification.
Number in parentheses are *t*-statistics.

Table 4
Determinants of Community College Enrolment Rates by Age,
Ontario, 1977-87

| Equation Specification | Constant | Real P.D.I. per capita (+) | Real Fees (-) | Unemployment Rate (+) | Female Dummy | Equation R2 | Statistics DW |
|---|---|---|---|---|---|---|---|
| **17-19 YEARS:** | | | | | | | |
| Levels | -8.529 | 1.328 | -2.022 | 0.235 | 2.637 | 0.966 | 1.78 |
| | (-2.59) | (6.93) | (-3.11) | (5.35) | (15.3) | | |
| Logs | -3.893 | 1.971 | -0.501 | 0.460 | 0.344 | 0.961 | 1.73 |
| | (-3.86) | (6.34) | (-3.27) | (4.35) | (13.4) | | |
| Logit | -4.759 | 0.194 | -0.352 | 0.032 | 0.374 | 0.967 | 1.88 |
| | (-10.1) | (7.07) | (-3.78) | (5.14) | (15.2) | | |
| **20-24 YEARS:** | | | | | | | |
| Levels | -10.905 | 1.467 | -0.827 | 0.135 | -1.004 | 0.972 | 1.11 |
| | (-9.39) | (19.4) | (-2.79) | (8.73) | (-11.9) | | |
| Logs | -7.873 | 3.698 | -0.404 | 0.373 | -0.256 | 0.953 | 0.70 |
| | (-11.3) | (14.5) | (-2.73) | (6.25) | (-9.43) | | |
| Logit | -6.757 | 0.360 | -0.270 | 0.033 | -0.26[illegible] | 0.957 | 0.63 |
| | (-18.4) | (15.1) | (-2.88) | (6.79) | (-9.[illegible]3) | | |
| **25+ YEARS:** | | | | | | | |
| Levels | -0.850 | 0.086 | 0.020 | 0.011 | 0.042 | 0.932 | 0.92 |
| | (-9.24) | (13.8) | (0.78) | (3.93) | (5.75) | | |
| Logs | -14.22 | 4.913 | -0.013 | 0.440 | 0.212 | 0.956 | 1.66 |
| | (-19.0) | (16.3) | (-0.07) | (5.57) | (6.32) | | |
| Logit | -11.839 | 0.467 | -0.006 | 0.075 | 0.213 | 0.959 | 1.62 |
| | (-29.7) | (17.2) | (-0.05) | (6.03) | (6.70) | | |

Number in parentheses are t-statistics.

**Table 5**
**Estimated Income and Price Elasticities for Community Colleges, By Gender, Ontario**

| Equation Specification | Income | | Price | |
|---|---|---|---|---|
| | Males | Females | Males | Females |
| 1968-87: | | | | |
| Total | 1.297 | 1.551 | -0.349 | -0.189 |
| 1977-87: | | | | |
| 17-19 Years | 2.190 | 1.722 | -0.518 | -0.508 |
| 20-24 Years | 2.930 | **4.516 | -0.382 | -0.362 |
| 25+ Years | 4.471 | 5.430 | -0.153 | 0.179 |

Notes: These elasticities are derived by introducing interactive dummy variables into the logarithmic function form. Statistically significant differences are indicated as follows: (*) at 5% level; (**) at 1% level.

**Table 6**
**Enrolment Rate Projections for Ontario Community Colleges, 1988-2000 (Percent)**

| Year | 17-19 | | 20-24 | | 25+ | |
|---|---|---|---|---|---|---|
| | Males | Females | Males | Females | Males | Females |
| 1988 | 6.18 | 9.22 | 5.30 | 5.02 | 0.20 | 0.29 |
| 1989 | 6.23 | 9.27 | 5.33 | 5.04 | 0.20 | 0.29 |
| 1990 | 6.38 | 9.42 | 5.42 | 5.13 | 0.20 | 0.30 |
| 1991 | 6.23 | 9.27 | 5.33 | 5.04 | 0.20 | 0.29 |
| 1992 | 6.13 | 9.17 | 5.26 | 4.97 | 0.20 | 0.29 |
| 1993 | 6.25 | 9.28 | 5.51 | 5.22 | 0.22 | 0.31 |
| 1994 | 6.29 | 9.32 | 5.71 | 5.42 | 0.23 | 0.33 |
| 1995 | 6.35 | 9.38 | 5.83 | 5.54 | 0.24 | 0.34 |
| 1996 | 6.46 | 9.50 | 6.08 | 5.79 | 0.26 | 0.35 |
| 1997 | 6.68 | 9.71 | 6.39 | 6.10 | 0.28 | 0.37 |
| 1998 | 6.94 | 9.98 | 6.73 | 6.44 | 0.30 | 0.40 |
| 1999 | 7.21 | 10.25 | 7.07 | 6.78 | 0.32 | 0.42 |
| 2000 | 7.53 | 10.56 | 7.43 | 7.14 | 0.35 | 0.44 |

Note: Projections based on linear enrolment rate equations in Table 4 and the authors' exogenous variable projections (see text for details).

**Table 7**
**Full-time Post-Secondary College Enrolment Projections**
**By Age, Ontario, 1988–2000**

| | 17-19 | | 20-24 | | 25+ | | Total | |
|---|---|---|---|---|---|---|---|---|
| | Male | Female | Male | Female | Male | Female | Domestic | Incl. Foreign[1] |
| 1988 | 13,572 | 19,252 | 20,917 | 19,435 | 5,906 | 9,105 | 88,189 | 95,043 |
| 1989 | 13,692 | 19,340 | 20,540 | 18,941 | 5,959 | 9,360 | 87,832 | 94,732 |
| 1990 | 13,742 | 19,228 | 20,582 | 18,859 | 6,103 | 9,914 | 88,428 | 95,328 |
| 1991 | 12,921 | 18,196 | 20,252 | 18,479 | 6,233 | 9,785 | 85,866 | 92,766 |
| 1992 | 12,623 | 17,943 | 19,936 | 18,088 | 6,346 | 9,960 | 84,896 | 91,796 |
| 1993 | 12,772 | 18,122 | 20,816 | 18,882 | 7,098 | 10,824 | 88,514 | 95,414 |
| 1994 | 12,851 | 18,220 | 21,313 | 19,389 | 7,544 | 11,709 | 91,026 | 97,926 |
| 1995 | 12,802 | 18,109 | 21,459 | 19,556 | 8,005 | 12,262 | 92,193 | 99,093 |
| 1996 | 12,991 | 18,249 | 21,849 | 19,962 | 8,810 | 12,823 | 94,684 | 101,584 |
| 1997 | 13,516 | 18,771 | 22,686 | 20,837 | 9,624 | 13,744 | 99,178 | 106,078 |
| 1998 | 14,257 | 19,582 | 23,678 | 21,852 | 10,449 | 15,054 | 104,872 | 111,772 |
| 1999 | 14,934 | 20,359 | 24,859 | 22,985 | 11,275 | 16,004 | 110,416 | 117,316 |
| 2000 | 15,791 | 21,177 | 26,049 | 24,153 | 12,496 | 16,979 | 116,645 | 123,545 |

Notes: Projections based on enrolment rates in Table 6 and Ontario Ministry of Treasury and Economics 'base case' population projection.

1. In 1988 there were 6,854 foreign students; for the projections a figure of 6,900 has been used.